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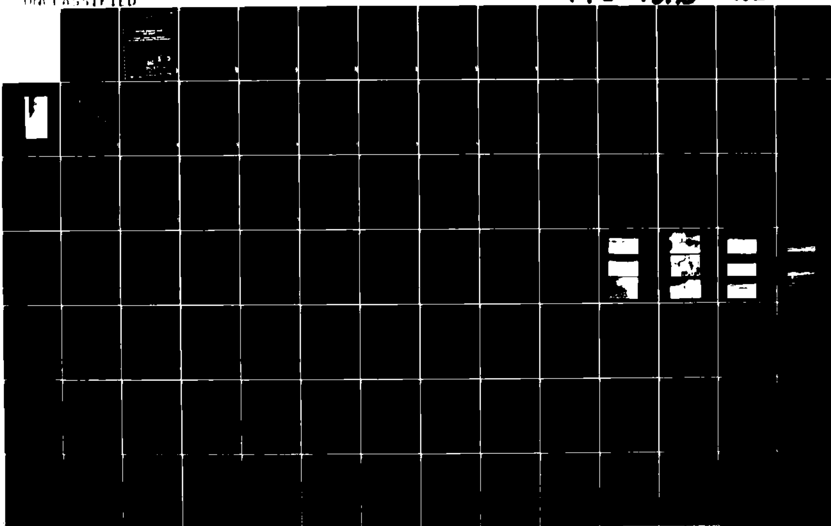

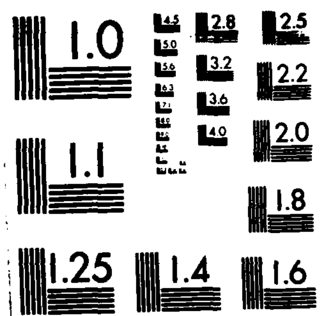

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Saint John River Basin
Limestone Maine
Noyes Brook

20. ABSTRACT (Continue on reverse side if necessary and identify by block number)

The earthfill embankment is 1000 ft. long and 31 ft. high. The facility was found in good condition. It is small in size with a high hazard classification. No urgent or emergency actions are required for the dam based on this inspection.

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DEPARTMENT OF THE ARMY
NEW ENGLAND DIVISION, CORPS OF ENGINEERS
424 TRAPELO ROAD
WALTHAM, MASSACHUSETTS 02254

REPLY TO
ATTENTION OF:
NEDED

SEP 23 1981

Honorable Joseph E. Brennan
Governor of the State of Maine
State Capitol
Augusta, Maine 04330

Dear Governor Brennan:

Inclosed is a copy of the Noyes Brook Dam (ME-00347) Phase I Inspection Report, prepared under the National Program for Inspection of Non-Federal Dams. This report is based upon a visual inspection, a review of the past performance and a brief hydrological study of the dam. I approve the report and support the findings and recommendations described in Section 7 and ask that you keep me informed of the actions taken to implement them. This follow-up action is vitally important.

Copies of this report have been forwarded to the Department of Agriculture and to the owner, Town of Limestone. Copies will be available to the public in thirty days.

I wish to thank you and the Department of Agriculture for your cooperation in in this program.

Sincerely,

C. E. EDGAR, III
Colonel, Corps of Engineers
Division Engineer

Incl
As stated

NOYES BROOK DAM

ME 00347

ST. JOHN RIVER BASIN
LIMESTONE, MAINE

PHASE I INSPECTION REPORT
NATIONAL DAM INSPECTION PROGRAM

NATIONAL DAM INSPECTION PROGRAM

PHASE I INSPECTION REPORT

Identification No.	:	ME 00347
Name of Dam	:	Noyes Brook Dam
Town	:	Limestone
County & State	:	Aroostook, Maine
Stream	:	Noyes Brook
Date of Inspection	:	November 8, 1979

BRIEF ASSESSMENT

Noyes Brook dam is a ten year old submerged sediment storage pool and flood water retarding structure designed by the USDA Soil Conservation Service. The earth fill embankment is 1000 feet long and 31 feet high. The downstream slope, the crest and the upstream slope above the pool are grass covered. A reinforced concrete drop inlet principal spillway leads to a 30 inch diameter reinforced concrete pipe conduit under the dam that ends in a reinforced concrete impact basin. A grass lined earth cut emergency spillway is provided 950 feet north of the left abutment. The pool is maintained behind the dam at a normal elevation of 594 NGVD (approximate depth of 14 feet).

The embankment dam, principal spillway drop inlet, principal spillway impact basin and emergency spillway were found in good condition. In the embankment itself, there were no abnormal dips, sags or other evidence of distress. The reinforced concrete structures were sound with no evidence of deterioration. The grass cover on the embankment and emergency spillway was well developed. A point of seepage at the maximum section downstream toe was observed at 1.5 gal/sec. This seepage was free of suspended or transported solids.

Based on a maximum storage of 350 acre-feet and a height of 31 feet, Noyes Brook Dam falls within the small size classification. The dam's hazard classification has been established as high based on the potential for loss of more than a few lives in the event of a dam failure. The test flood used was the probable maximum flood. The test flood was estimated for the 2.85 square mile drainage area of rolling terrain using the "Preliminary Guidance for Estimating Maximum Probable Discharges in Phase I Safety Investigations", New England Division Corps of Engineers, March 1978. This yielded a peak inflow of 3900 cfs (1370 csm) and a peak routed outflow of 3470 cfs (about 11% reduction). The computed maximum reservoir level El. 608.9 was below the embankment crest El. 611.2 NGVD and no overtopping of the embankment would occur.

No urgent or emergency actions are required for Noyes Brook Dam based on this inspection. Remedial measures include monitoring the seepage at the toe of the dam, monitoring the project during periods of intense rainfall, developing a downstream warning system and conducting bi-annual technical inspections. These measures should be initiated within two years.

J. E. Giles Jr.

J.E. Giles, Jr., P.E.
Project Manager
Massachusetts PE No. 1643

This Phase I Inspection Report on **Noyes Brook Dam (ME-00347)** has been reviewed by the undersigned Review Board members. In our opinion, the reported findings, conclusions, and recommendations are consistent with the Recommended Guidelines for Safety Inspection of Dams, and with good engineering judgement and practice, and is hereby submitted for approval.

Aramast Mahtesian

ARAMAST MAHTESIAN, MEMBER
Geotechnical Engineering Branch
Engineering Division

Carney M. Terzian

CARNEY M. TERZIAN, MEMBER
Design Branch
Engineering Division

J W Finegan

JOSEPH W. FINEGAN, JR., CHAIRMAN
Water Control Branch
Engineering Division

APPROVAL RECOMMENDED:

Joe B. Fryar

JOE B. FRYAR
Chief, Engineering Division

PREFACE

This report is prepared under guidance contained in the Recommended Guidelines for Safety Inspection of Dams, for Phase I Investigations. Copies of these guidelines may be obtained from the Office of Chief of Engineers, Washington, D.C. 20314. The purpose of a Phase I Investigation is to identify expeditiously those dams which may pose hazards to human life or property. The assessment of the general condition of the dam is based upon available data and visual inspections. Detailed investigation, and analyses involving topographic mapping, subsurface investigations, testing, and detailed computational evaluations are beyond the scope of Phase I investigation: however, the investigation is intended to identify any need for such studies.

In reviewing this report, it should be realized that the reported condition of the dam is based on observations of field conditions at the time of inspection along with data available to the inspection team. In cases where the reservior was lowered or drained prior to inspection, such action, while improving the stability and safety of the dam, removes the normal load on the structure and may obscure certain conditions which might otherwise be detectable if inspected under the normal operating environment of the structure.

It is important to note that the condition of a dam depends on numerous and constantly changing internal and external conditions, and is evolutionary in nature. It would be incorrect to assume that the present condition of the dam will continue to represent the condition of the dam at some point in the future. Only through continued care and inspection can there be any chance that unsafe conditions be detected.

Phase I inspections are not intended to provide detailed hydrologic and hydraulic analyses. In accordance with the established Guidelines, the Spillway Test flood is based on the estimated "Probable Maximum Flood" for the region (greatest reasonably possible storm runoff), or fractions thereof. Because of the magnitude and rarity of such a storm event, a finding that a spillway will not pass the test flood should not be interpreted as necessarily posing a highly inadequate condition. The test flood provides a measure of relative spillway capacity and serves as an aid in determining the need for more detailed hydrologic and hydraulic studies, considering the size of the dam, its general condition and the downstream damage potential.

The Phase I Investigation does not include an assessment of the need for fences, gates, no-trespassing signs, repairs to existing fences and railings and other items which may be needed to minimize trespass and provide greater security for the facility and safety to the public. An evaluation of the project compliance with OSHA rules and regulations is also excluded.

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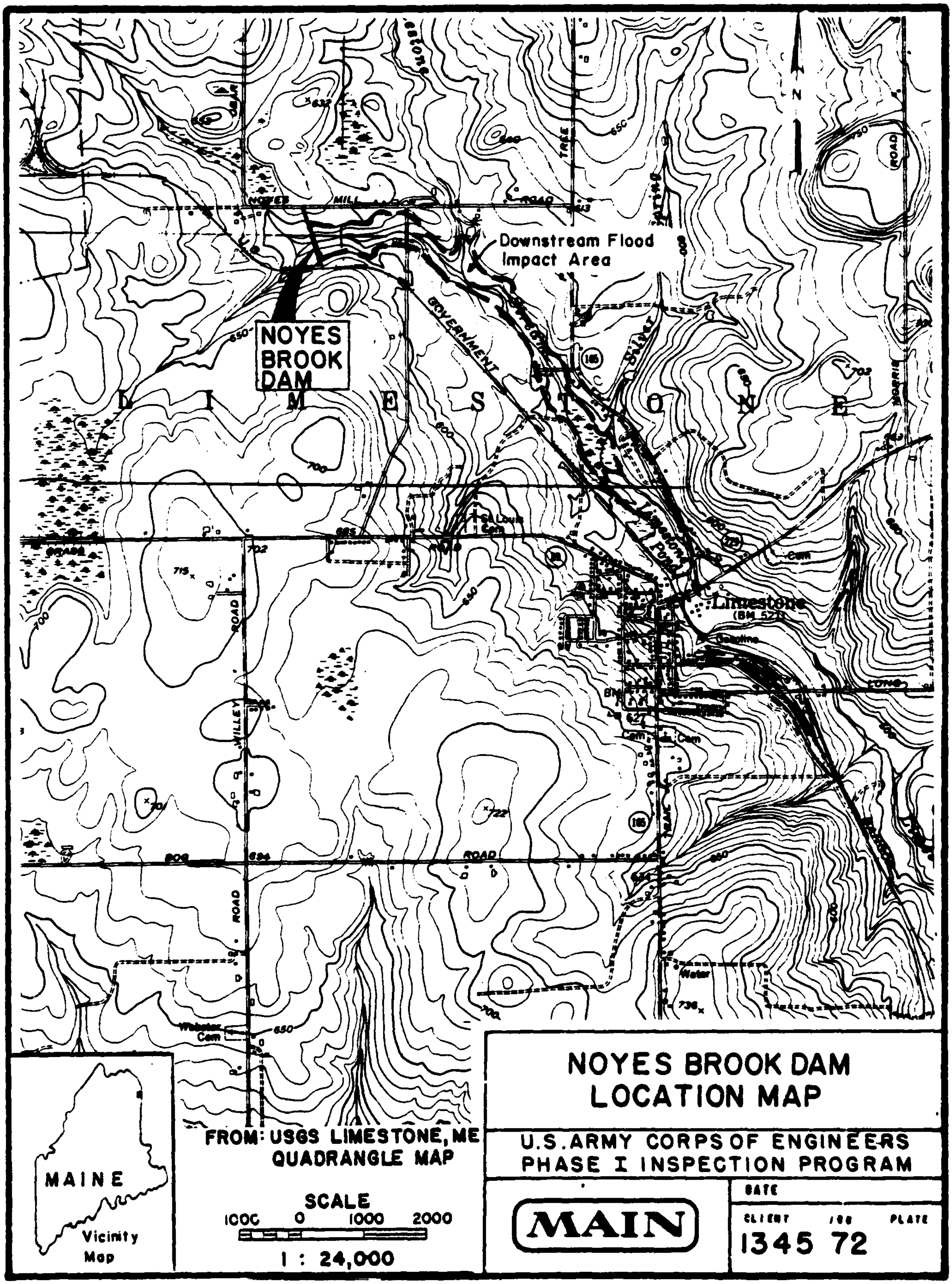
OVERVIEW PHOTO



NOYES BROOK DAM
LOCATION MAP

U.S. ARMY CORPS OF ENGINEERS
PHASE I INSPECTION PROGRAM

MAIN

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CLIENT	JOB	PLATE
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NATIONAL DAM INSPECTION PROGRAM

PHASE I INSPECTION REPORT

NOYES BROOK DAM, LIMESTONE MAINE

SECTION I

PROJECT INFORMATION

1.1 General

a. Authority - Public Law 92-367, August 8, 1972 authorized the Secretary of the Army, through the Corps of Engineers, to initiate a National Program of Dam Inspection throughout the United States. The New England Division of the Corps of Engineers has been assigned the responsibility of supervising the inspection of dams within the New England Region. Chas. T. Main, Inc. has been retained by the New England Division to inspect and report on selected dams in the State of Maine. Authorization and notice to proceed were issued to Chas. T. Main, Inc. under a letter of November 6, 1979 from Max B. Scheider, Colonel, Corps of Engineers. Contract No. DACW 33-80-C-0011 has been assigned by the Corps of Engineers for this work.

b. Purpose - The purposes of the inspection program are:

(1) To perform technical inspection and evaluation of non-Federal dams to identify conditions which threaten the public safety and thus permit correction in a timely manner by non-Federal interests.

(2) To encourage and prepare the states to initiate effective dam safety programs for non-Federal dams.

(3) To update, verify and complete the National Inventory of Dams.

c. Scope of Inspection Program - The scope of this Phase I inspection report includes:

(1) Gathering, reviewing and presenting all available data as can be obtained from the owners, previous owners, the state and other associated parties.

(2) A field inspection of the facility detailing the visual condition of the dam, embankments and appurtenant structures.

(3) Computations concerning the hydraulics and hydrology of the facility and its relationship to the calculated flood through the existing spillway.

(4) An assessment of the condition of the facility and corrective measures required.

It should be noted that this report does not pass judgment on the safety or stability of the dam other than on a visual basis. The inspection is to identify those features of the dam which need corrective action and/or further study.

1.2 Description of Project

a. Location - The Noyes Brook Dam is located on Noyes Brook, one half mile above its confluence with Limestone Stream and 1.5 miles northeast of the Town of Limestone, Aroostook County, Maine. The dam location is included on U.S.G.S. 7.5 minute series Quadrangle, Limestone, Maine with approximate coordinates N46°55'50", W67°50'50".

b. Description of Dam and Appurtenances - The project is a dual purpose recreation and floodwater retarding structure. It consists of three principal features: an earthfill dam, a principal spillway, and an emergency spillway. The dam is 1000 feet long, 31 feet high, and 14 feet wide at its crest. Material excavated from the emergency spillway channel was used for the fill in the dam. The fill materials are of glacial till origin with zoning limited to placing the more impervious material in the core and the more pervious material in the outside shells. The structure has a toe drain system with collector pipes and a central cutoff trench.

The principal spillway is a double 7'-6" wide ungated drop intake to a 30 inch diameter reinforced concrete pipe under the dam. The 30-inch pipe is provided with anti-seep collars and discharges into a reinforced concrete impact basin (energy dissipator). The dam has a 15" drain that discharges into the 30" conduit. The emergency spillway is an excavated, grass lined, earth channel approximately 950 feet from the left abutment. It is 226.4 feet wide at crest elevation of 607 feet with 2 horizontal to 1 vertical side slopes. The discharge from the emergency spillway is directed away from the downstream channel into Limestone Stream to the east (see drawing 2 of 18, page B-3).

Plans, profiles, and sections of the dam and its appurtenent structures are included in Appendix B. Photographs are shown in Appendix C.

c. Size Classification - The maximum embankment height is 31 feet above the stream channel and the maximum storage is 350 acre feet at El. 611.2. This gives the dam a small size classification (less than 1000 ac.-ft and less than 40' high) according to the Recommended Guidelines for Safety Inspection of Dams.

d. Hazard Classification - This facility is classified as a high hazard potential dam based on the potential for loss of more than a few lives in the event of a dam failure in six occupied dwellings 1200 to 4200 feet downstream of the dam.

e. Ownership - The dam and associated works are owned by the Town of Limestone, Maine.

f. Operators - The project is designed for unsupervised operation. No manual operations are required to pass a flood flow. The project is operated and maintained by the Town of Limestone, Maine. The responsible person is Mr. Thomas Stevens, Town Manager, Limestone, Maine 04750, Telephone (207) 325-3131.

g. Purpose of Dam - The project is a floodwater retarding structure of standard USDA SCS design. The reservoir drain intake sluice gate is currently closed and the reservoir maintained at El. 594 NGVD for fish and recreation purposes.

h. Design and Construction History - The project was designed by the USDA Soil Conservation Service and constructed by Hornbrook, Inc. in 1970.

i. Normal Operating Procedures - The reservoir is normally maintained at El. 594. All flood flows are passed through the principal and emergency spillways which are designed for uncontrolled discharge. No other operating procedures are in evidence.

1.3 Pertinent Data

a. Drainage Area - Noyes Brook Dam controls a drainage area of 2.85 square miles. The watershed is approximately 65 percent wooded and 35 percent agricultural. The slopes are gentle with one large swamp area upstream. The watershed ranges from Elev. 720 to Elev 580.

b. Discharge at Damsite

(1) Outlet Works - A screw operated sluice gate and 15"Ø CMP provide the capability to drain the reservoir to El. 582.5 NGVD. This drain discharges into the base of the principle spillway riser.

(2) Maximum known flood - Unknown.

(3) Principal spillway capacity at top of dam - 155 cfs @ El. 611.2.

(4) Principal spillway capacity at emergency spillway crest elevation - 143 cfs @ El. 607.

(5) Gated spillway capacity at normal pond elevation - N/A.

(6) Principal spillway capacity at test flood elevation - 148 cfs @ El. 608.9.

(7) Emergency spillway capacity at test flood elev. - 3470 cfs @ El. 608.9.

(8) Total project discharge at top of dam - 13,748 cfs @ El. 611.2.

(9) Total project discharge at test flood elevation - 3,625 cfs @ El. 608.9.

c. Elevations (feet above NGVD)

(1) Streambed at toe of dam	580.0
(2) Bottom of cutoff	576.0
(3) Maximum tailwater	Not available
(4) Normal pool (Max. Depth = 14')	594.0
(5) Full flood control pool	607.0
(6) Spillway crest	
(a) Principal	594.0
(b) Emergency spillway crest	607.0
(7) Design surcharge (Original Design)	unknown
(8) Top of dam	611.2
(9) Test flood surcharge	608.9

d. Reservoir (Length in feet)

(1) Normal pool	1000
(2) Flood control pool	2800

(3) Spillway crest pool		
	(a) Principal	1000
	(b) Emergency spillway crest pool	2800
(4) Top of dam		3400
(5) Test flood pool		3100

e. Storage (acre-feet)

(1)	Normal pool	94
(2)	Flood control pool	255
(3)	Spillway crest pool	255
(4)	Top of dam	350
(5)	Test flood pool	265

f. Reservior Surface (acres)

(1)	Normal pool	4
(2)	Flood-control pool	33
(3)	Spillway crest	33
(4)	Test flood pool	38
(5)	Top of dam	45

g. Dam

(1)	Type	Earthfill
(2)	Length	1000 feet
(3)	Height	31 feet
(4)	Top Width	14 feet
(5)	Side Slopes	Upstream 3 Hor. to 1 Vert. Downstream 2.5 Hor. to 1 Vert.
(6)	Zoning	2 zones

(7) Impervious Core | Most impervious toward the core

(8) Cutoff | 5' trench

(9) Grout curtain | None

(10 Other | None

h. Diversion and Regulating Tunnel - None

i. Spillway (Principal)

(1) Type - Reinforced concrete riser to 30" ϕ conduit

(2) Length of weir - 15'

(3) Crest elevation - El. 594 NGVD

(4) Gates - Ungated

(5) U/S Channel - N/A

(6) D/S Channel - Natural

(7) General - Reinforced Concrete Impact Basin at Outfall

Spillway (Emergency)

(8) Weir crest - El. 607 NGVD

(9) Length of weir - 226.4'

(10) U/S Channel - Grass lined earth channel

(11) D/S Channel - Grass lined earth channel

(12) General - 2 Hor. to 1 Vert. side slopes

j. Regulating Outlets

(1) Invert - El. 582.5 NGVD

(2) Size - 15" ϕ CMP

(3) Description - Sluice gate to drain reservoir

(4) Control Mechanism - 15" ϕ Sluice gate w/screw operator

(5) Other - None

SECTION 2

ENGINEERING DATA

2.1 Design

As built drawings of Noyes Brook Dam are on file at the GSA Federal Archives and Records Center, 380 Trapelo Road, Waltham, MA 02154 (617-223-2657). Design calculations and specifications were not available. The December 1964 Limestone Stream Watershed Work Plan indicates that:

> ". . .hydrology and hydraulics analyses followed procedures given in the National Engineering Handbook of the Soil Conservation Service, Section 4, Supplement A, Hydrology (NEH 4A) and Section 5, Hydraulics (NEH 5)."

and for civil works:

> "All designs are in accord with the latest Soil Conservation Service design criteria as set forth in Engineering Memoranda SCS-27, 31, 4D and 42; Technical Release No. 10; Section 3.21, Hydrology, Supplement A of the National Engineering Handbook; U.S. Weather Bureau Technical Paper No. 40; and other sources of recognized engineering material."

2.2 Construction

The Noyes Dam and appurtenances were constructed in 1970 by Hornbrook, Inc. No construction records or photographs were available to the inspection team. A set of "as built" construction prints was reviewed. Those pertinent to this report are included in Appendix B.

2.3 Operation

No formal operational procedures were available for review. The principal and emergency spillways are uncontrolled structures requiring no manual operations.

2.4 Evaluation

a. Availability: A set of project design (SCS) drawings and a set of typical Soil Conservation Service Construction Specifications for nearby Durepo Brook Dam were reviewed.

b. Adequacy: The evaluation was based on visual inspection, past performance history and engineering judgment and experience.

c. Validity: The limited data available restrict evaluation of the Noyes Brook Dam and appurtenances to the visual inspection and

engineering judgment. The field inspection indicated that the external features of Noyes Brook Dam substantially agree with those shown on the available plans.

SECTION 3

VISUAL INSPECTION

3.1 Findings

a. General - The field inspection was conducted by L. Seward and J. Jonas of Chas. T. Main, Inc. on 8 November 1979 and J.E. Giles, Jr., August 12, 1981. On the date of inspection, the Noyes Brook Dam and appurtenances were in good condition. No urgent or emergency actions are required at this time.

b. Dam

(1) Crest - The embankment crest was true to line with no abnormal dips, sags, cracks or other evidence of distress (Photos 2, 7 and 9). The as-built camber was observed and appears unchanged. At the left abutment, adjacent to Noyes Road, there is a low point which can be seen in the original design (see drawing number 2 of 18, page B-3; at station 13+00) and is apparent visually (Photos 7 & 8). It is understood from speaking with the local residents that during times of high water, there is a considerable flow (say 500-1000 cfs) that flows over Noyes Road at the left abutment. This flow runs down the road for a short distance and then turns back in towards the downstream channel. Wheel tracks were observed on the crest. The crest is grass covered with no pavement.

(2) Upstream slope - The upstream slope riprap appeared in good condition. The slope above the normal pool El. 594 has a well developed tight grass cover (Photo 1). There was no evidence of sloughing or erosion on the slope.

(3) Downstream slope - The downstream slope (Photo 7) has a well developed, tight grass cover. No significant gully action was observed on the slope. No slides or sags were observed.

(4) Downstream toe - The downstream toe is generally dry with no boils or seeps observed except at the toe drain (Photo 3). On the right side of the riprapped toe drain near sta. 25+00, a 1 1/2 gal/sec seep was issuing from the riprap. The flow carried no sediment or suspended fines (Photo 6).

(5) Underdrain system - Two 6-inch diameter toe drain collector pipes issue from the dam adjacent to the principal spillway outlet. These outlets both had minor clear flows.

(6) Instrumentation - No instrumentation was observed.

c. Appurtenant Structures

(1) Principal Spillway - The principal spillway intake (Photo 4) was observed from shore. The exposed concrete and trashrack steel appeared in good condition.

(2) Outlet works - The outlet impact basin (Photo 5) was found in good condition. All construction joints were tight. No spalling was observed. The reservoir drain inlet was submerged and could not be inspected. The outlet conduit could not be inspected. It was reported by the Project Operator (Limestone Town Manager) that the drain had not been recently operated.

(3) Emergency spillway - The emergency spillway was clear of debris and in good condition with a well developed grass cover.

d. Reservoir Area - No areas of potential or actual shoreline movement were observed.

e. Downstream Channel - The downstream channel (Photo 6) was clear with no evidence of erosion.

3.2 Evaluation - In general, the dam and appurtenances are in good condition. The toe seepage at the time of the inspection was within acceptable limits. The slopes are stable and the crest is in good shape. The concrete structures are sound. The low point at the left abutment is at approximate Elev. 608 which is one foot above the emergency spillway crest. Any water which flows over at this low point will flow down the road for a short way and then back towards the downstream channel. Erosion of the downstream toe is not considered a problem in this area. No urgent or emergency repairs are required.

SECTION 4

OPERATIONAL AND MAINTENANCE PROCEDURES

4.1 Operational Procedures

a. General: The principal and emergency spillways are uncontrolled crest structures. No manual operations are required to insure safe passage of a flood flow. No recent operation of the reservoir drain is reported.

b. Description of Downstream Warning System: No warning system or emergency evacuation plans are in effect for this project.

4.2 Maintenance Procedures

a. General: The Town of Limestone has an operation and maintenance agreement with the Soil Conservation Service. Each dam is inspected at least once annually and after every major storm. An inspection report is prepared and any required maintenance is then performed by the town.

b. Operating Facilities: There are no manual operating facilities at this structure except for the reservoir drain gate on the principal spillway riser. No regular maintenance procedures for the project operating facilities are specified. Repairs are made as required.

4.3 Evaluation

The operating and maintenance procedures are limited for this project. The owner should establish procedures to inspect the structures regularly, to monitor the seepage at the toe of the dam, to keep the embankment free of brush and trees, and to monitor the project during periods of intense rainfall. The owner should arrange to have a technical inspection made on a bi-annual basis and establish a warning system to follow in the event of emergency conditions.

SECTION 5

EVALUATION OF HYDROLOGIC AND HYDRAULIC FEATURES

5.1 General - The watershed is 2.85 square miles of undeveloped rolling terrain. The dam is located on the Noyes Brook, about 0.5 miles upstream from the confluence with Limestone Stream. The earth embankment develops sufficient storage to reduce the Probable Maximum Flood (PMF) peak from 3900 cfs (1370 csm) to 3470 cfs (about 11% reduction).

5.2 Design Data - The dam was designed by the Soil Conservation Service, U.S. Department of Agriculture. The top of the dam elevation varies according to the as-built drawing (page B-3) from 611.7 feet at center to 611.2 feet at both abutments. This 0.5 foot varience, is the allowance for natural settlement at the center of the dam. The maximum height of the dam is 31.2 feet (capacity 350 ac. ft.) and is classified as a small dam. The principal spillway consists of a reinforced concrete riser, a gated reservoir drain, a principal spillway conduit with anti-seep collars and an energy dissipating structure at the outlet with a rip-rapped channel. The dam is equipped with a remote emergency spillway located approximately 950 feet north of the left abutment. The plans show that the emergency spillway channel bottom width is 226.4 feet which has a crest elevation of 607.0 feet. The plans indicate a channel depth at the crest of 9-12 feet, with channel side slopes of 2:1. The emergency spillway discharges away from the downstream channel (Noyes Brook) directing the flow into Limestone Stream to the east. At the left abutment of the dam there is a low spot (Station 18+00) which was designed to allow for water to flow over during the Design High Water (Elev. 608.8). This flow will then be directed over Noyes Road and back into the downstream channel.

5.3 Experience Data - There are no records of past floods or any overtopping of the dam.

5.4 Test Flood Analysis - Based upon "Preliminary Guidance for Estimating Maximum Probable Discharge", dated March 1978, the watershed classification (rolling), and our hydraulic computations, the test flood for this high hazard, small size dam is estimated to be equivalent to the PMF of 3900 cfs (1370 csm). The flood routing starting elevation was selected to be the recreation pool elevation (594 ft), and the inflow hydrograph peak was reduced by the volume between emergency spillway crest and principal spillway intake elevations. For this particular portion of Maine, the PMF runoff is assumed to be 13". The routed test flood outflow was determined in accordance with Corps of Engineers "Guidance for Estimating Effect of Surcharge Storage on Maximum Probable Discharges", and the hydraulic characteristics of the reservoir. The emergency spillway discharge was computed as open channel flow. The routed test flood outflow was determined as 3470 cfs, and corresponding water surface El. 608.9 ft. The top of the dam elevation is 611.2 ft and thus the dam

would not be overtopped. The emergency spillway capacity is more than 100 percent of the test flood. As a check, a second test flood routing was performed assuming weir control in the emergency spillway and the dam was not overtopped under these conditions.

5.5 Dam Failure Analysis - The volume in the reservoir corresponding to the water surface elevation 608.9 ft is 260 ac. - ft. which is considered at the time of dam failure. The impact of failure of the dam was assessed using the "Rule of Thumb Guidance for Estimating Downstream Dam Failure Hydrographs" prepared by the Corps of Engineers. The breach discharge was estimated with the maximum water surface elevation during the test flood. The breach width was selected to be 35 percent of the length of the dam at mid-height. The discharge through the emergency spillway was not considered in the downstream prefailure flow since it is directed away from Noyes Brook and into Limestone Stream. An estimated flow of 1000 cfs was assumed for the downstream prefailure flow due to the low point at the left abutment and the principal spillway discharge. The total peak discharge during breach was estimated to be 84,200 cfs.

The results show that prior to dam failure there will be no flooding of the two houses located at Reach 4 (1200 feet downstream), about eight feet above the channel bed. Further downstream at Reach 14 (4200 feet downstream) the prefailure flow will cause some minor flooding of two houses located very near the channel bed but no flooding in the remaining four houses located some six to eight feet above the channel bed. The prefailure flow is assumed to be 1000 cfs. This results in a water depth of approximately four feet in the downstream channel through Reach 14 (4200 feet from the dam). In the event of a dam failure, the initial wave was calculated to reach a depth of 16.7 feet at Reach 4 where two houses will be impacted by about nine feet of water and a depth of 10.9 feet at Reach 14 where the four previously unflooded houses will be impacted by about four to six feet of water. In view of these results it is concluded that more than a few lives could be lost in the event of dam failure. Thus this dam constitutes a high hazard potential.

SECTION 6

EVALUATION OF STRUCTURAL STABILITY

6.1 Visual Observation

The visual inspection of November 8, 1979 revealed no dips, sags, depressions or other evidence of instability. Seepage of 1.5 gallons per second of clear water was observed at the toe of the downstream slope.

6.2 Design and Construction Data

Design calculations and construction records were not available for review in preparing this report. The construction drawings for the dam were reviewed. A typical construction specification for Durepo Brook Dam was reviewed as it was reported to be similar to the Noyes Brook specification. The Noyes Brook and Durepo Dam designs and specifications are according to SCS standard practice for floodwater retarding structures.

6.3 Post Construction Changes

No evidence of modification to the dam since construction was observed.

6.4 Seismic Stability

The dam is located in Seismic Zone No. 2 and, in accordance with recommended Phase I guidelines, does not warrant seismic analysis.

SECTION 7

ASSESSMENT, RECOMMENDATIONS AND REMEDIAL MEASURES

7.1 Dam Assessment

a. Condition - The visual inspection indicates that Noyes Brook Dam is in good condition. The inspection revealed that there is a seepage of about 1.5 gallons per second at the downstream toe of the dam near Station 25+00.

b. Adequacy of Information - The lack of in-depth engineering data did not allow for a definitive review. Therefore, the adequacy of this dam could not be assessed from the standpoint of reviewing design and construction data but is based primarily on visual inspection, past performance history and sound engineering judgment.

c. Urgency - The recommendations and remedial measures presented below should be implemented by the owner within two years of receipt of this Phase I Inspection Report.

7.2 Recommendations - None

7.3 Remedial Measures The owner should:

a. Monitor the seepage at the toe of the dam on at least a monthly basis. If any significant change in the flow volume or coloration is observed, engage a qualified registered professional engineer to determine its significance.

b. Implement a monthly visual inspection program of the dam and appurtenances. Observations should be recorded in a maintenance log.

c. Establish a system to monitor the project during periods of intense rainfall.

d. Develop a downstream warning plan in the event of an emergency at the dam.

e. Conduct bi-annual technical inspections of the project.

f. Establish regular maintenance procedures at the project and continue to keep the embankments free of brush and trees.

g. Remove the brush and trees from the downstream toe to a distance approximately 25' downstream.

h. Obtain and maintain a set of as-built drawings and technical investigation reports.

i. Insure the operability of the reservoir drain.

7.4 Alternatives

There are no practical alternatives to the recommendations of Sections 7.2 and 7.3.

APPENDIX A

FIELD INSPECTION CHECK LIST

30

INSPECTION CHECKLIST

PARTY ORGANIZATION

PROJECT Noyes Brook Dam

DATE Nov. 8, 1979

TIME 12:00 Noon

WEATHER Fair - 40°F

U.S. ELEV. ______ U.S. ____ DN.S.

PARTY:

1. Lewis B. Seward - Hydrologist
2. Jan N. Jonas - Civil Engineer
3. Peerless J. Snow - Project Operator (Town Manager, Limestone)
4. J.E. Giles, Jr. - Project Manager August 12, 1981
5.
6.
7.
8.
9.
10.

PROJECT FEATURE	INSPECTED BY	REMARKS
1. All of the project features were inspected by each of the party members.		
2.		
3.		
4.		
5.		
6.		
7.		
8.		
9.		
10.		

INSPECTION CHECKLIST

PROJECT Noyes Brook Dam DATE Nov. 8, 1979

PROJECT FEATURE Earthfill Dam NAME Lewis B. Seward

DISCIPLINE Hydro NAME Jan N. Jonas

AREA EVALUATED	CONDITIONS
DAM EMBANKMENT	
Crest Elevation	611.2
Current Pool Elevation	594.0
Maximum Impoundment to Date	214 Ac./Ft.
Surface Cracks	None Visible
Pavement Condition	Riprap on u/s thick grass on d/s
Movement or Settlement of Crest	None noticable
Lateral Movement	None noticable
Vertical Alignment	No change noticed
Horizontal Alignment	No change noticed
Condition at Abutment and at Concrete Structures	Riprap at concrete struc.; undisturbed earthfill at abutment
Indications of Movement of Structural Items on Slopes	None
Trespassing on Slopes	Seeps at d/s rt. of outlet structure
Vegetation on Slopes	Thick grass
Sloughing or Erosion of Slopes or Abutments	No sloughing noticed
Rock Slope Protection - Riprap Failures	Riprap in good condition
Unusual Movement or Cracking at or near Toes	No cracking noticed
Unusual Embankment or Downstream Seepage	Concentrated outflow of about 1½ gal./sec from riprap toe rt. side
Piping or Boils	None
Foundation Drainage Features	Outflow from both outlet structure
Toe Drains	Drain openings
Instrumentation System	None noticed

INSPECTION CHECKLIST

PROJECT Noyes Brook Dam

DATE Nov. 8, 1979

PROJECT FEATURE Earthfill Dam

NAME Lewis B. Seward

DISCIPLINE Hydro

NAME Jan N. Jonas

AREA EVALUATED	CONDITIONS
OUTLET WORKS - INTAKE CHANNEL AND INTAKE STRUCTURE	
a. Approach Channel	None
Slope Conditions	
Bottom Conditions	
Rock Slides or Falls	
Log Boom	
Debris	
Condition of Concrete Lining	
Drains or Weep Holes	
b. Intake Structure	Concrete overflow with gate valve
Condition of Concrete	Good
Stop Logs and Slots	None

INSPECTION CHECKLIST

PROJECT Noyes Brook Dam DATE Nov. 8, 1979

PROJECT FEATURE Earthfill Dam NAME Lewis B. Seward

DISCIPLINE Hydro NAME Jan N. Jonas

AREA EVALUATED	CONDITIONS
OUTLET WORKS - CONTROL TOWER	
a. Concrete and Structural	
General Condition	Very good
Condition of Joints	Tight
Spalling	None
Visible Reinforcing	None
Rusting or Staining of Concrete	None
Any Seepage or Efflorescene	None
Joint Alignment	Good alignment
Unusual Seepage or Leaks in Gate Chamber	Not applicable
Cracks	None
Rusting or Corrosion of Steel	None
b. Mechanical and Electrical	
Air Vents	None noticed
Float Wells	Not applicable
Crane Hoist	Not applicable
Elevator	Not applicalbe
Hydraulic System	Not applicable
Service Gates	Not applicable
Emergency Gates	Manually operated from top of struc
Lightning Protection System	None
Emergency Power System	None
Wiring and Lighting System in Gate Chamber	None

INSPECTION CHECKLIST

PROJECT Noyes Brook Dam DATE Nov. 8, 1979

PROJECT FEATURE Earthfill Dam NAME Lewis B. Seward

DISCIPLINE Hydro NAME Jan N. Jonas

AREA EVALUATED	CONDITIONS
OUTLET WORKS - TRANSITION AND CONDUIT	
General Condition of Concrete	Good
Rust or Staining on Concrete	None
Spalling	"
Erosion or Cavitation	"
Cracking	"
Alignment of Monoliths	"
Alignment of Joints	"
Numbering of Monoliths	"

INSPECTION CHECKLIST

PROJECT Noyes Brook Dam

DATE Nov. 8, 1979

PROJECT FEATURE Earthfill Dam

NAME Lewis B. Seward

DISCIPLINE Hydro

NAME Jan N. Jonas

AREA EVALUATED	CONDITIONS
OUTLET WORKS - OUTLET STRUCTURE AND OUTLET CHANNEL	
General Condition of Concrete	Very good
Rust or Staining	None
Spalling	None
Erosion or Cavitation	None
Visible Reinforcing	None
Any Seepage or Efflorescence	None
Condition at Joints	Joints were tight
Drain Holes	Two circular openings at outlet, rip-raped bed for seeping water at toe.
Channel	
Loose Rock or Trees Overhanging Channel	Some small trees overhanging brook channel
Condition of Discharge Channel	Grassed banks with shrubs and small trees

INSPECTION CHECKLIST

PROJECT Noyes Brook Dam — DATE Nov. 8, 1979

PROJECT FEATURE Earthfill Dam — NAME Lewis B. Seward

DISCIPLINE Hydro — NAME Jan N. Jonas

AREA EVALUATED	CONDITIONS
OUTLET WORKS - SPILLWAY WEIR, APPROACH AND DISCHARGE CHANNELS	
a. Approach Channel	None
General Condition	
Loose Rock Overhanging Channel	
Trees Overhanging Channel	
Floor of Approach Channel	
b. Weir and Training Walls	
General Condition of Concrete	
Rust or Staining	
Spalling	
Any Visible Reinforcing	
Any Seepage or Efflorescence	
Drain Holes	
c. Discharge Channel	Not applicable - fields and meadows
General Condition	
Loose Rock Overhanging Channel	
Trees Overhanging Channel	
Floor of Channel	
Other Obstructions	

INSPECTION CHECKLIST

PROJECT Noyes Brook Dam — DATE Nov. 8, 1979

PROJECT FEATURE Earthfill Dam — NAME Lewis B. Seward

DISCIPLINE Hydro — NAME Jan N. Jonas

AREA EVALUATED	CONDITIONS
OUTLET WORKS - SERVICE BRIDGE	
a. Super Structure	Not applicable
Bearings	
Anchor Bolts	
Bridge Seat	
Longitudinal Members	
Under Side of Deck	
Secondary Bracing	
Deck	
Drainage System	
Railings	
Expansion Joints	
Paint	
b. Abutment & Piers	
General Condition of Concrete	
Alignment of Abutment	
Approach to Bridge	
Condition of Seat & Backwall	

APPENDIX B

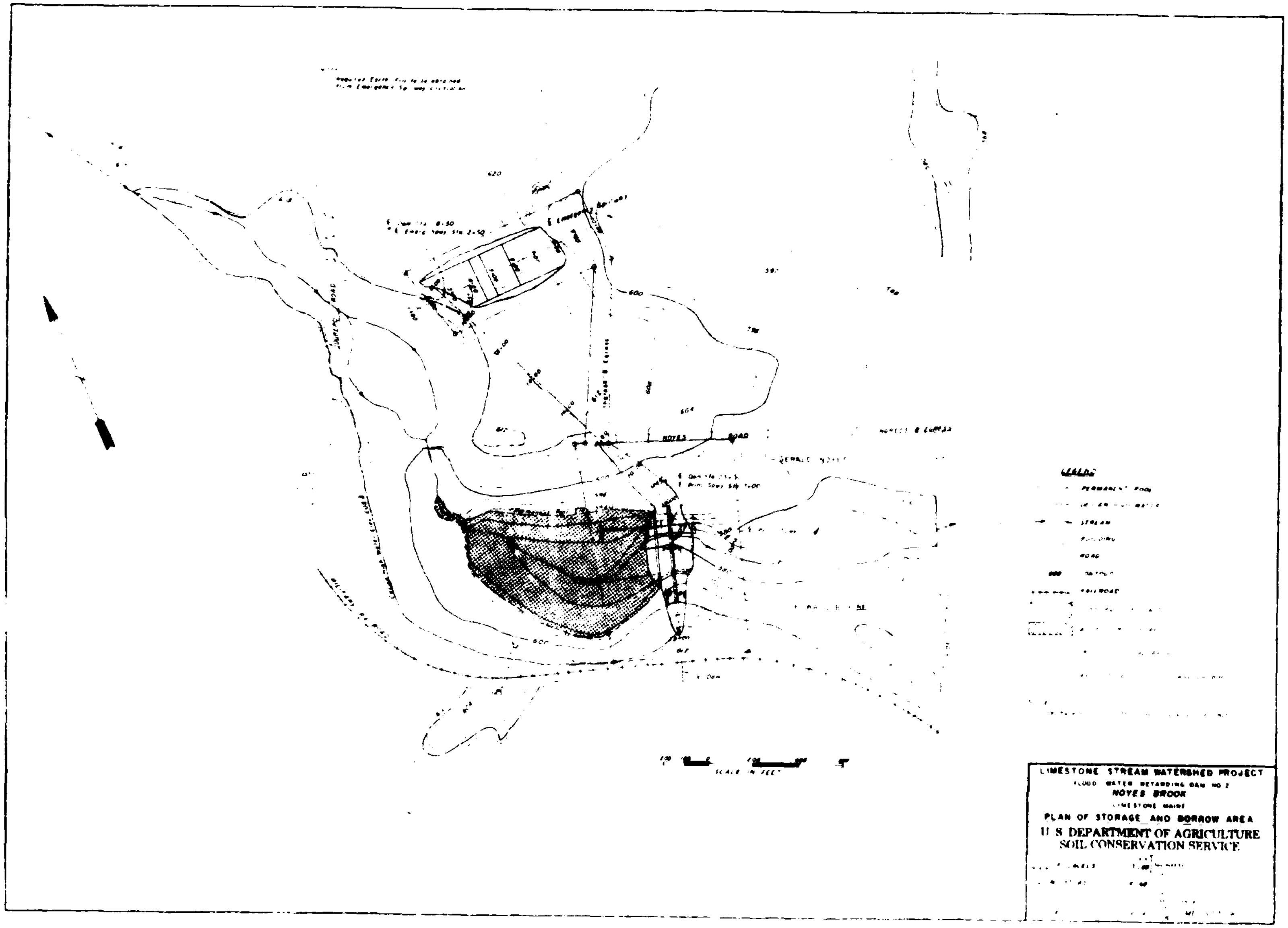
ENGINEERING DATA

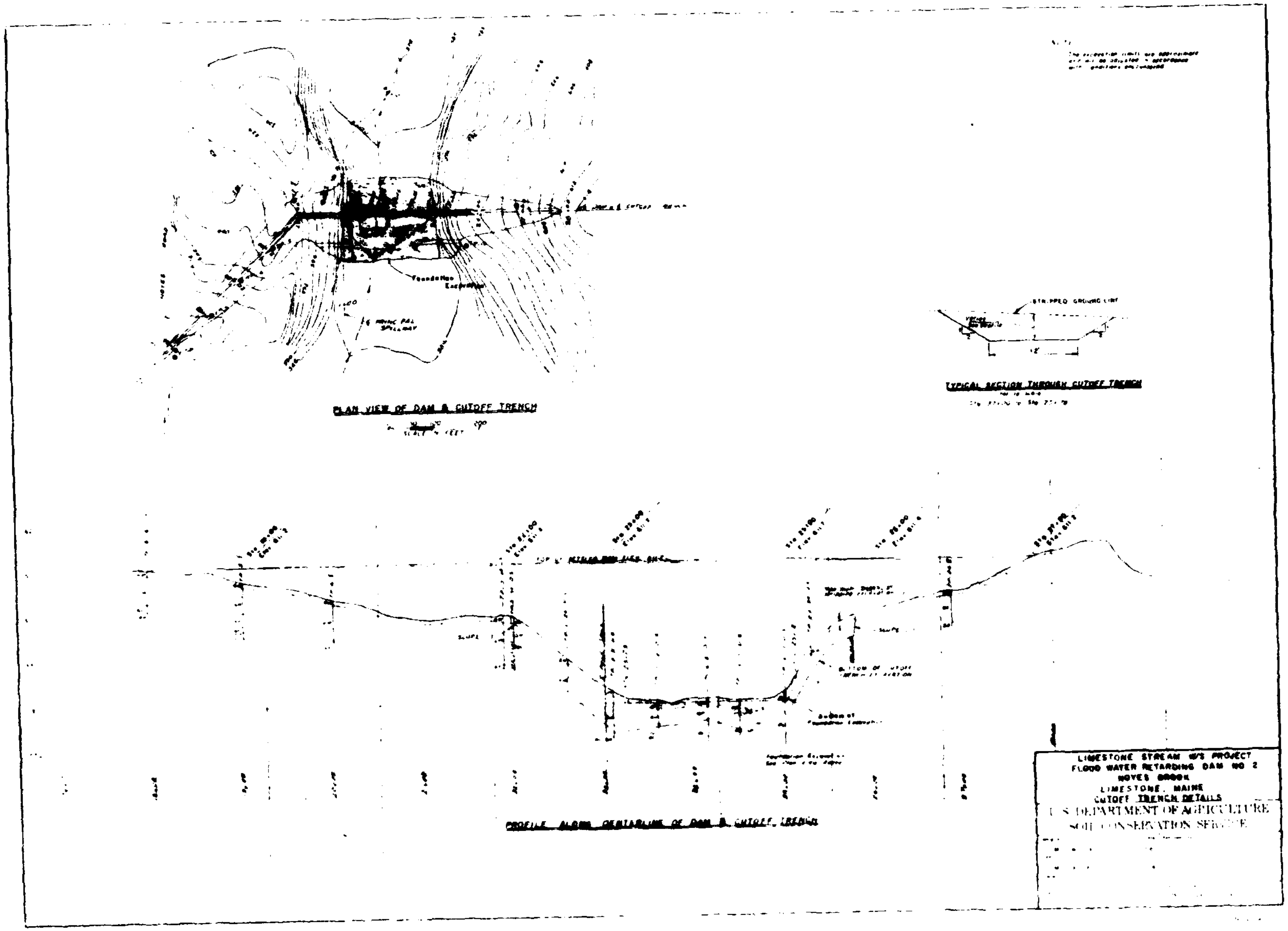
Note: 1. All design records are in storage at the:

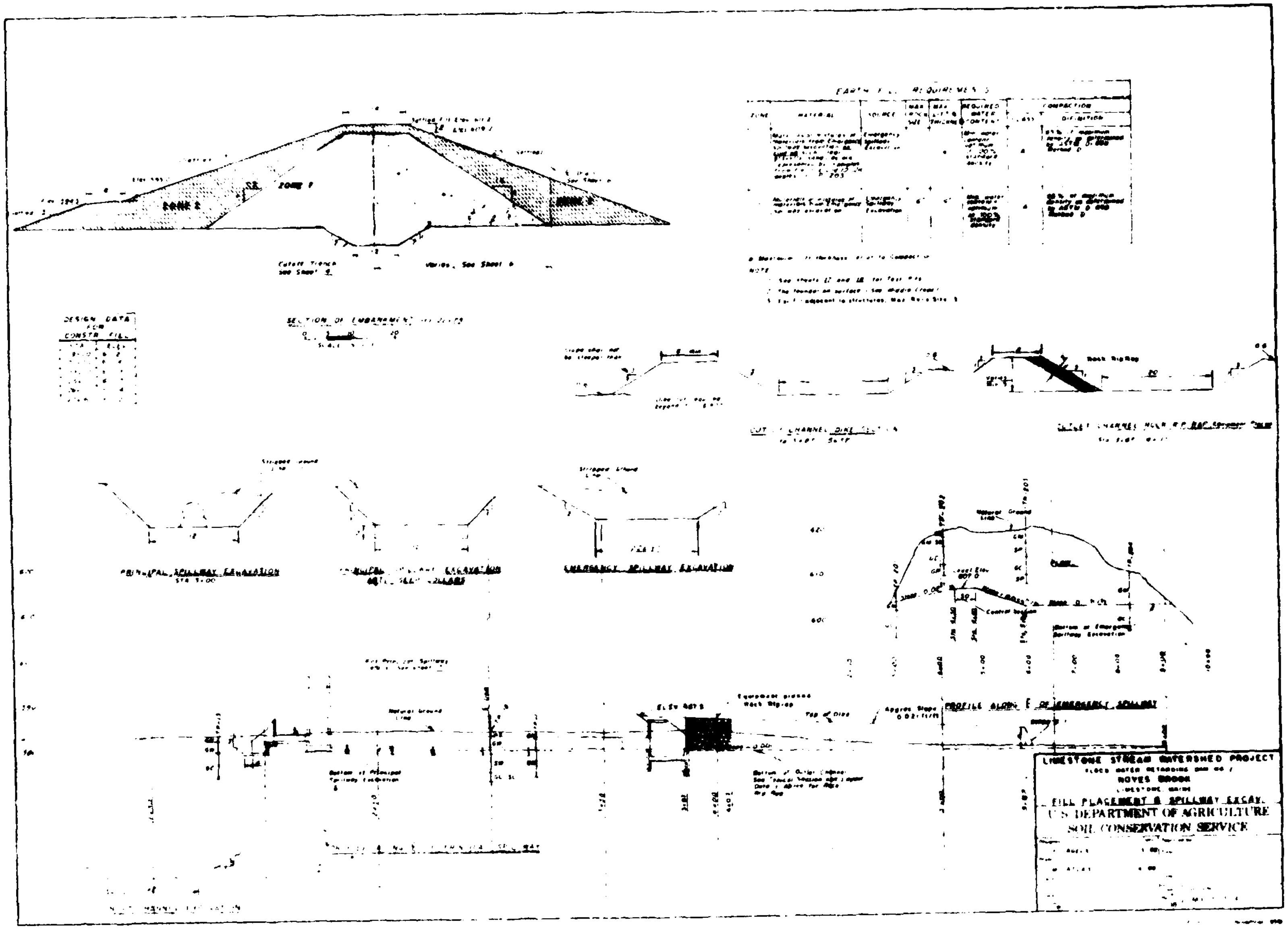
National Archives and Records Service
GSA Federal Archives and Records Center
380 Trapelo Road, Waltham, Massachusetts
617-223-2657

2. No past inspection reports were available for review.

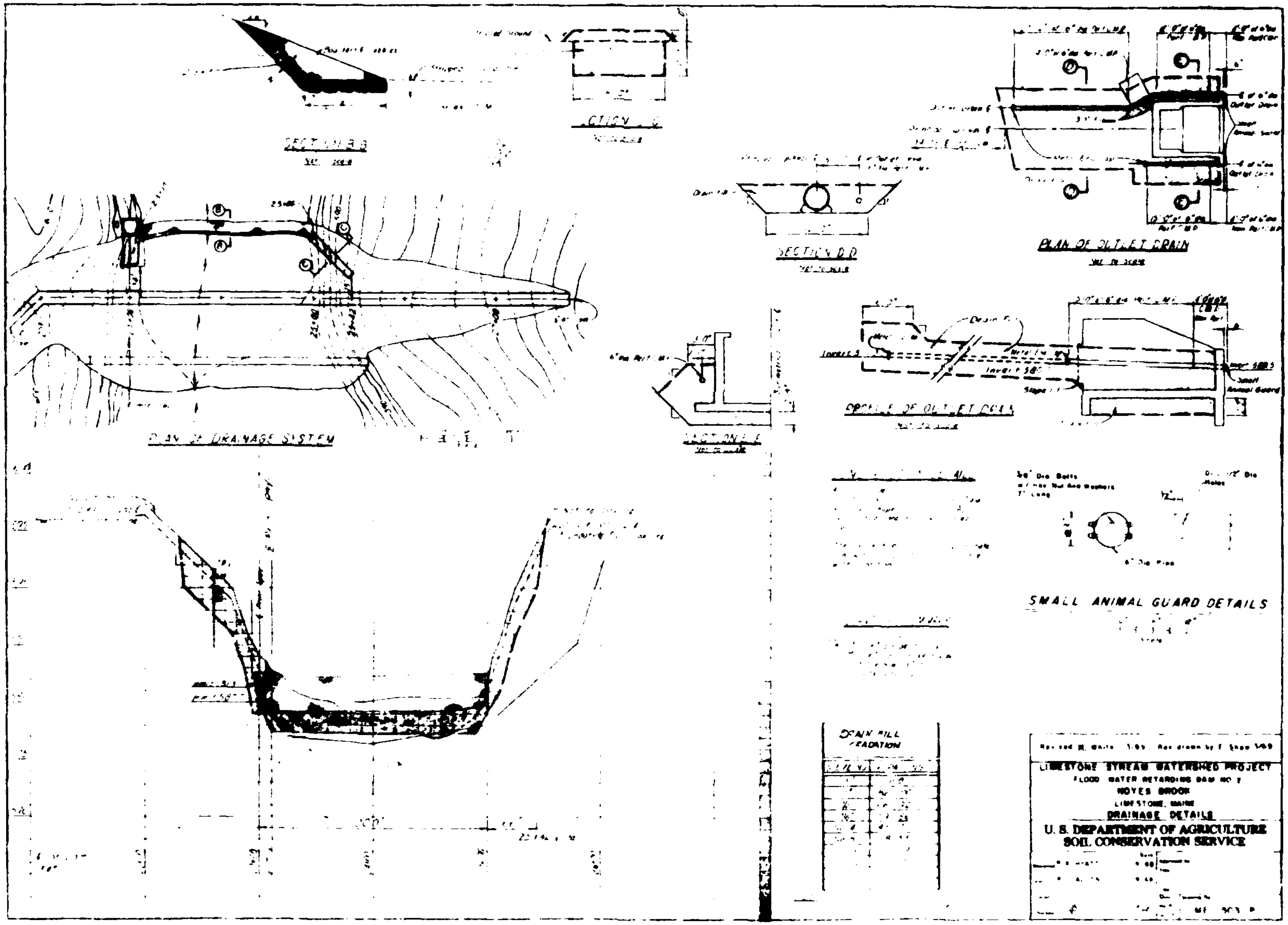
3. The following drawings are as built prints.


LIMESTONE STREAM WATERSHED PROJECT
FLOOD WATER RETARDING DAM NO 2
NOYES BROOK
LIMESTONE MAINE
PLAN OF STORAGE AND BORROW AREA
U S DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
LEGEND
PERMANENT POOL
STREAM
ROAD
RAILROAD
NOYES ROAD
SCALE IN FEET

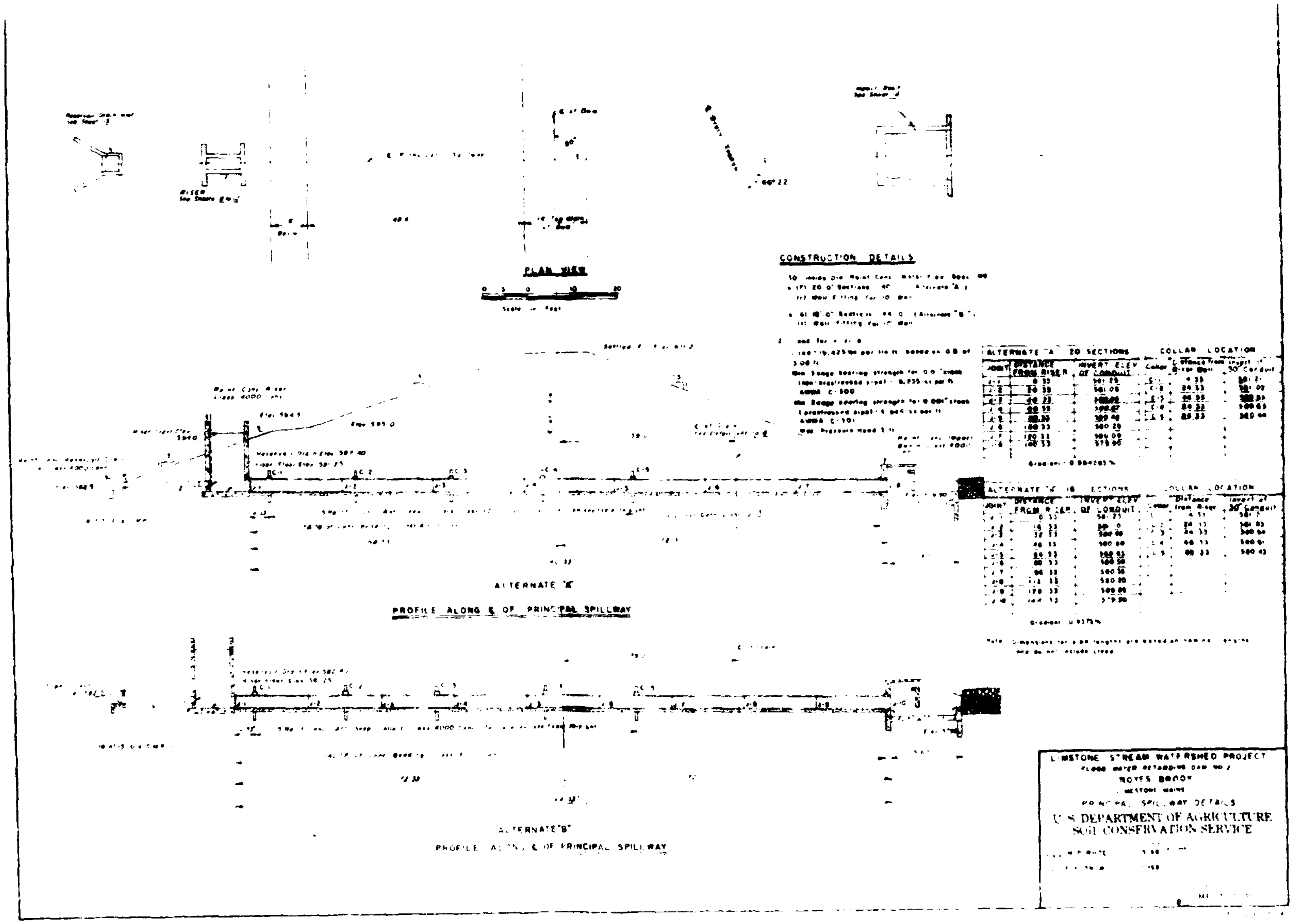

PLAN VIEW OF DAM & CUTOFF TRENCH
Foundation Excavation
STRIPPED GROUND LINE
TYPICAL SECTION THROUGH CUTOFF TRENCH
PROFILE ALONG CENTERLINE OF DAM & CUTOFF TRENCH
LIMESTONE STREAM W/S PROJECT
FLOOD WATER RETARDING DAM NO 2
NOYES BROOK
LIMESTONE, MAINE
CUTOFF TRENCH DETAILS
U.S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE



EARTH FILL REQUIREMENTS
SECTION OF EMBANKMENT
DESIGN DATA FOR CONSTR. FILL
PRINCIPAL SPILLWAY EXCAVATION
EMERGENCY SPILLWAY EXCAVATION
PROFILE ALONG ℄ OF EMERGENCY SPILLWAY
LIMESTONE STREAM WATERSHED PROJECT
NOYES BROOK
FILL PLACEMENT & SPILLWAY EXCAV.
U.S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE



SECTION B-B
SECTION
PLAN OF DRAINAGE SYSTEM
SECTION D-D
PLAN OF OUTLET DRAIN
PROFILE OF OUTLET DRAIN
SECTION E-E
SMALL ANIMAL GUARD DETAILS
DRAIN FILL GRADATION
LIMESTONE STREAM WATERSHED PROJECT
FLOOD WATER RETARDING DAM NO 2
NOYES BROOK
LIMESTONE, MAINE
DRAINAGE DETAILS
U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE


PLAN VIEW
Scale in Feet
CONSTRUCTION DETAILS
ALTERNATE "A"
PROFILE ALONG ℄ OF PRINCIPAL SPILLWAY
ALTERNATE "B"
PROFILE ALONG ℄ OF PRINCIPAL SPILLWAY
ALTERNATE "A" 20' SECTIONS
COLLAR LOCATION
JOINT
DISTANCE FROM RISER
INVERT ELEV OF CONDUIT
Collar
30" Conduit
Distance from Riser
Invert of 30" Conduit
RISER
LIMSTONE STREAM WATERSHED PROJECT
NOYES BROOK
U.S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

LIMESTONE STREAM WATERSHED PROJECT
FLOOD - WATER RETARDING DAM NO 2

NOYES BROOK

LIMESTONE, MAINE

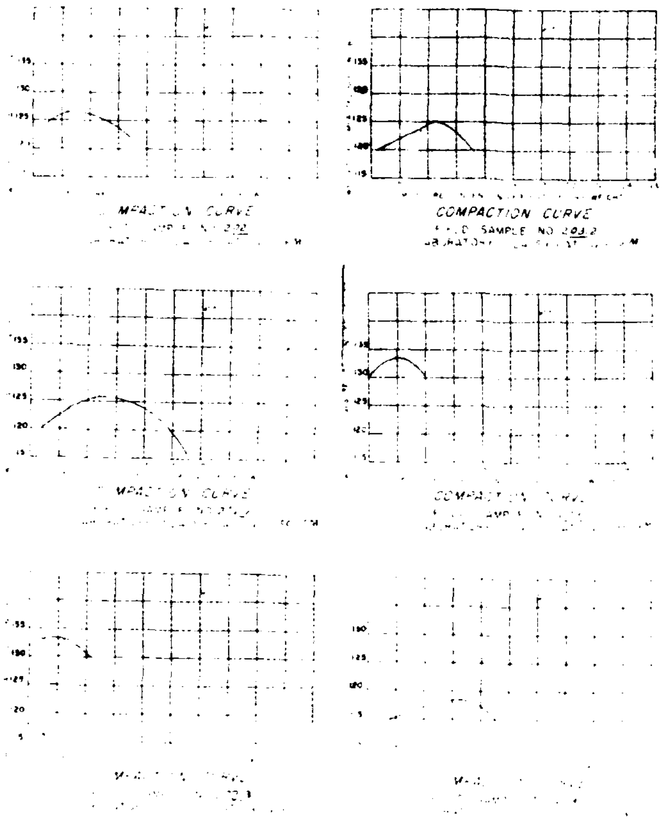
TEST PITS

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

INVESTIGATED D. EDWARDS

L. GERRY

ME 501-P



Test Pit (backhoe)
Ground Water Table
Upstream or downstream
Emergency Spillway
Left Abutment or Right Abutment
Field classification
Lab classification

1-99 Centerline of Dam
101-199 Borrow Area
201-299 Emergency Spillway

Sh Shale

GW Well graded gravels; gravel sand mixture
GP Poorly graded gravels
GM Silty gravels, gravel-sand-silt mixtures
GC Clayey gravels; gravel-sand-clay mixtures
SW Well graded sand; sand-gravel mixtures
SP Poorly graded sands
SM Silty sands, sand-silt mixtures
SC Clayey sand; sand-clay mixtures
ML Silts; silty, v. fine sands; sandy or clayey silts
CL Clays of low to medium plasticity, silty, sandy, or gravelly clays
Pt Peat

NOTE: All descriptions and classifications based on visual observations and the Unified Soil Classification System.

All test pits are located on plans and profiles for the site.

Test pitting accomplished from 6/21/67 to 6/27/67. All test pits logged by R. Erickson, Geologist.

All test pits were dug with a truck-mounted hydraulic backhoe.

All test hole depths are in feet.

LIMESTONE STREAM WATERSHED PROJECT
FLOOD - WATER RETARDING DAM NO 2
NOYES BROOK
LIMESTONE, MAINE
TEST PITS

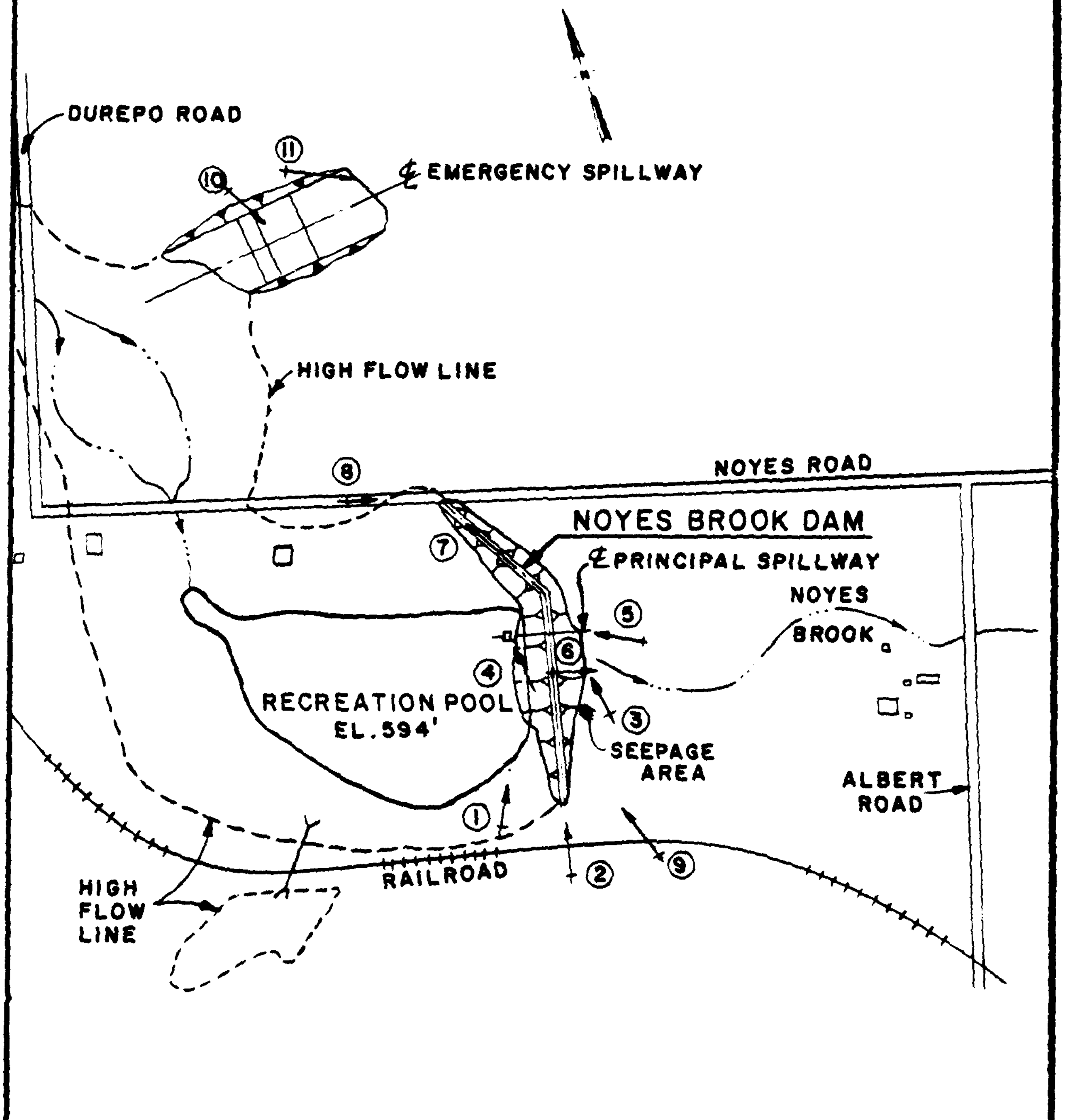
U S DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

L. SERRY 2/68

ME-503-P

APPENDIX C

PHOTOGRAPHS



NOYES BROOK DAM PHOTO LOCATION	
U.S. ARMY CORPS OF ENGINEERS PHASE I INSPECTION PROGRAM	
MAIN	DATE CLIENT 1345 JOB 72 PLATE 3

Photo 1

Upstream Slope From
Right Abutment

Photo 2

Crest From
Right Abutment

Photo 3

Downstream Toe
Seepage Area
& Toe Drain Detail

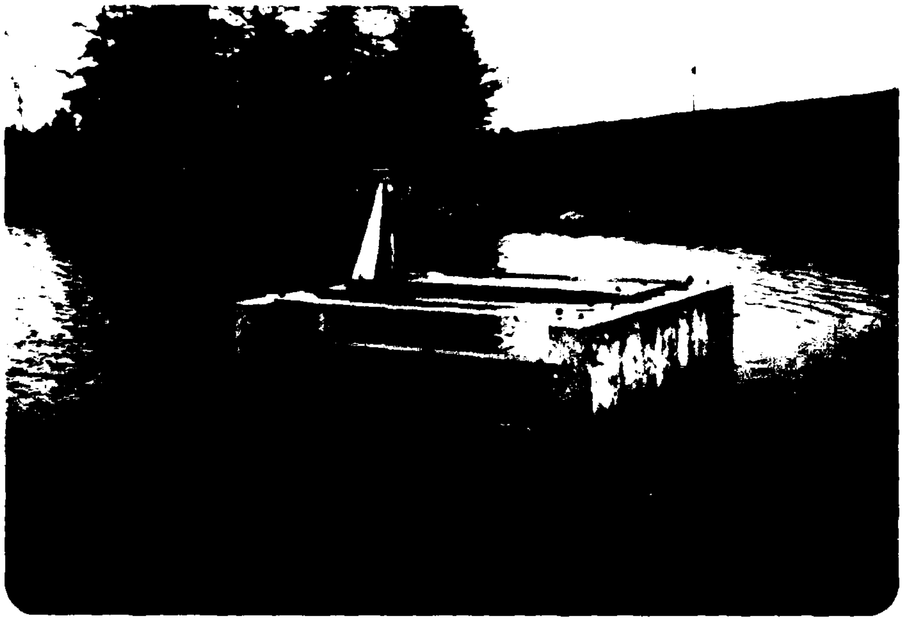


Photo 4

Principal Spillway

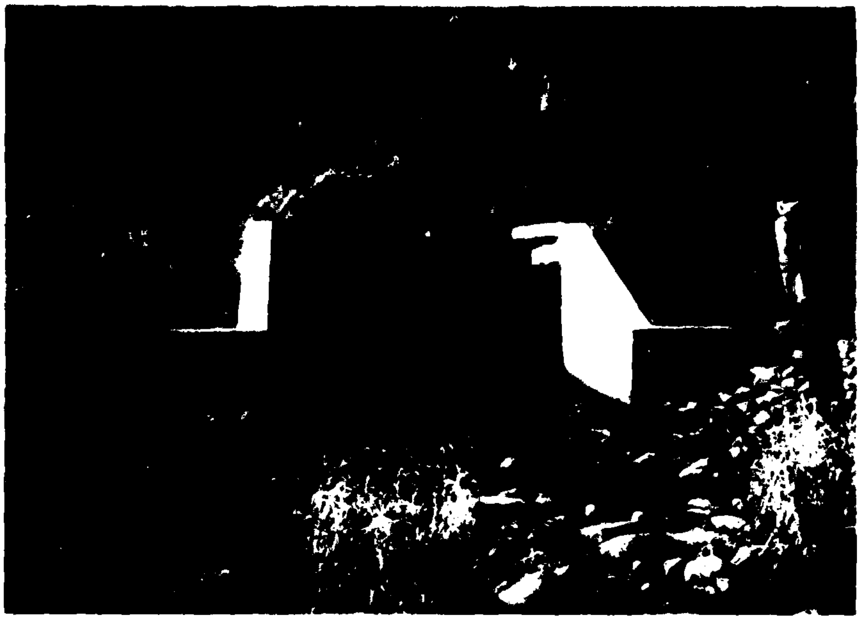


Photo 5

Impact Basin &
Underdrain Outfalls

Photo 6

Downstream Channel

Photo 7

Crest of Dam

Toward left Abutment

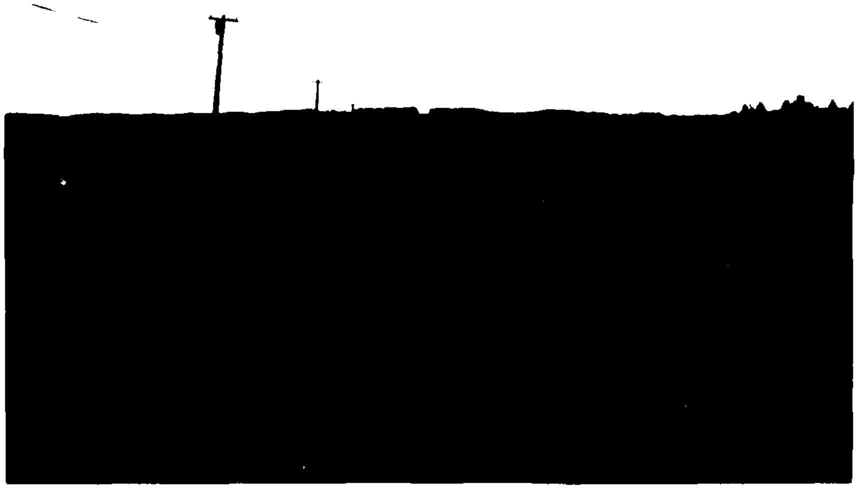


Photo 8

View of Noyes Road

Looking Downstream at

Left Abutment of Dam

Photo 9

Downstream Slope from

Right Abutment

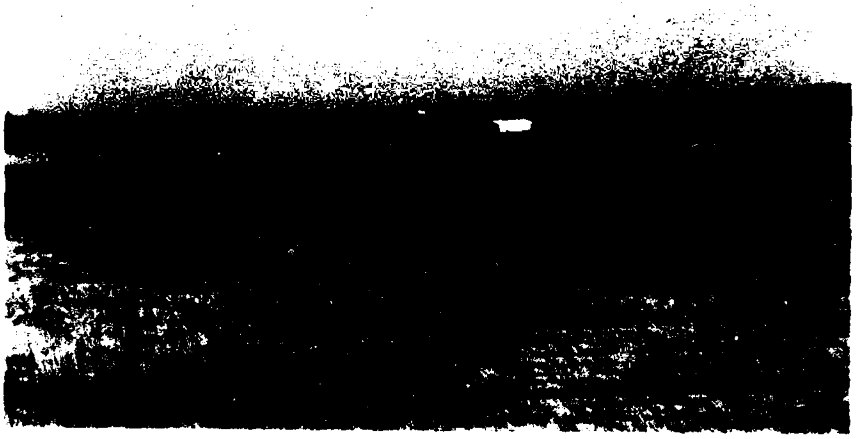


Photo 10

Emergency Spillway from left embankment. Noyes Brook Dam is beyond the red house.

Photo 11

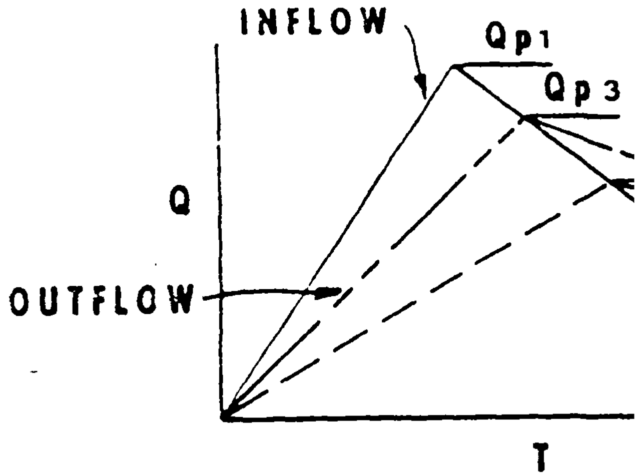
Emergency Spillway viewed from left embankment looking downstream.

DIX D

AULIC COMPUTATIONS

ESTIMATING EFFEC

ON MAXIMUM



STEP 1: Determine P
Curves.

STEP 2: a. Determine
"Qp1".

b. Determine
(STOR1) In

c. Maximum
England e

Qp_2 =

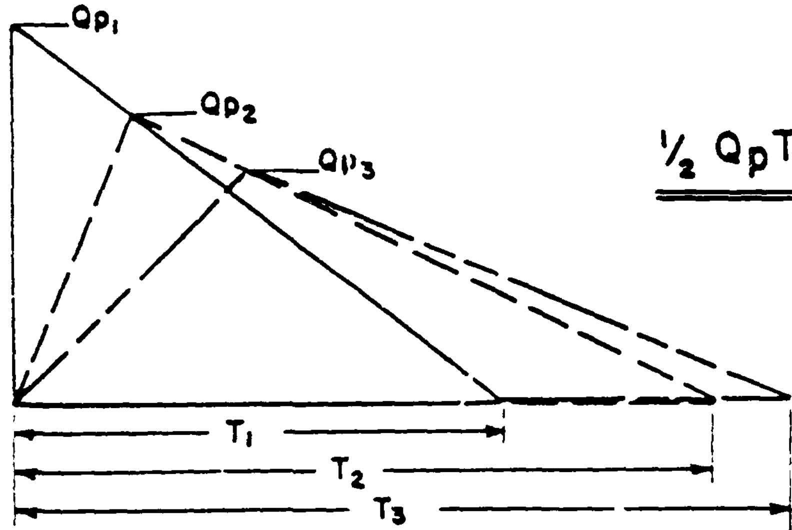
STEP 3: a. Determin
"STOR2"

b. Average

Determin

Resulting

"RULE OF THUMB" GUIDANCE FOR ESTIMATING DOWNSTREAM DAM FAILURE HYDROGRAPHS



$$\frac{1}{2} Q_p T = 12\,S$$

STEP 1: DETERMINE OR ESTIMATE RESERVOIR STORAGE (S) IN AC-FT AT TIME OF FAILURE.

STEP 2: DETERMINE PEAK FAILURE OUTFLOW (Q_{p1}).

$$Qp_1 = \frac{8}{27} W_b \sqrt{g}\, Y_o^{3/2}$$

W_b = BREACH WIDTH - SUGGEST VALUE NOT GREATER THAN 40% OF DAM LENGTH ACROSS RIVER AT MID HEIGHT.

Y_o = TOTAL HEIGHT FROM RIVER BED TO POOL LEVEL AT FAILURE.

STEP 3: USING USGS TOPO OR OTHER DATA, DEVELOP REPRESENTATIVE STAGE-DISCHARGE RATING FOR SELECTED DOWNSTREAM RIVER REACH.

STEP 4: ESTIMATE REACH OUTFLOW (Q_{p2}) USING FOLLOWING ITERATION.

A. APPLY Q_{p1} TO STAGE RATING, DETERMINE STAGE AND ACCOPMANYING VOLUME (V_1) IN REACH IN AC-FT. (NOTE: IF V_1 EXCEEDS 1/2 OF S, SELECT SHORTER REACH.)

B. DETERMINE TRIAL Q_{p2}.

$$Qp_2(\text{TRIAL}) = Qp_1\left(1 - \frac{V_1}{S}\right)$$

C. COMPUTE V_2 USING Q_{p2} (TRIAL).

D. AVERAGE V_1 AND V_2 AND COMPUTE Q_{p2}.

$$Qp_2 = Qp_1\left(1 - \frac{V_{ave}}{S}\right)$$

STEP 5: FOR SUCCEEDING REACHES REPEAT STEPS 3 AND 4.

APRIL 1978

SURCHARGE STORAGE ROUTING SUPPLEMENT

STEP 3: a. Determine Surcharge Height and "$STOR_2$" To Pass "Qp_2"

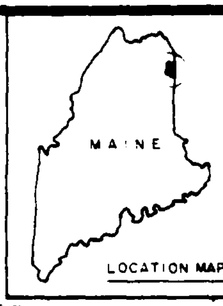
b. Avg "$STOR_1$" and "$STOR_2$" and Compute "Qp_3".

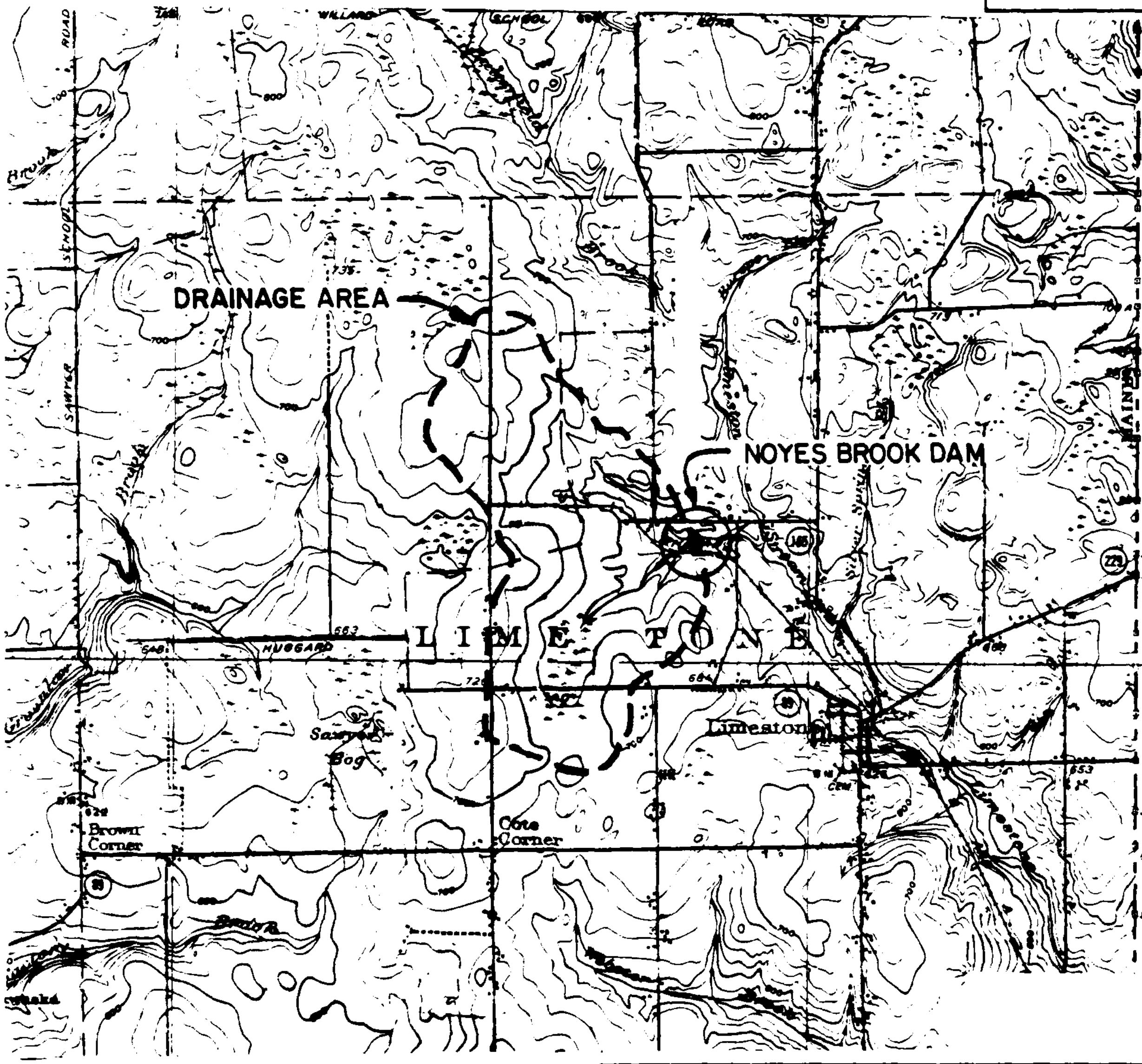
c. If Surcharge Height for Qp_3 and "$STOR_{AVG}$" agree O.K. If Not:

STEP 4: a. Determine Surcharge Height and "$STOR_3$" To Pass "Qp_3"

b. Avg. "Old $STOR_{AVG}$" and "$STOR_3$" and Compute "Qp_4"

c. Surcharge Height for Qp_4 and "New $STOR_{Avg}$" should Agree closely





MAP SOURCE: US DI-GS FORT FAIRFIELD & VAN BUREN, MAINE QUADR. SHEETS.
Scale 1 = 62500

0 1 MI. 2 Mi.

NOYES BROOK DAM
DRAINAGE AREA MAP

U.S. ARMY CORPS OF ENGINEERS
PHASE I INSPECTION PROGRAM

MAIN

DATE		
CLIENT	JOB	PLATE
1345	72	1

MAIN

Client: CORPS OF ENGINEERS — Job No. 1345-072/015 — Sheet 1 of 23

Subject: NOYES BROOK RESERVOIR — By T-OTOVA — Date 2-3-81

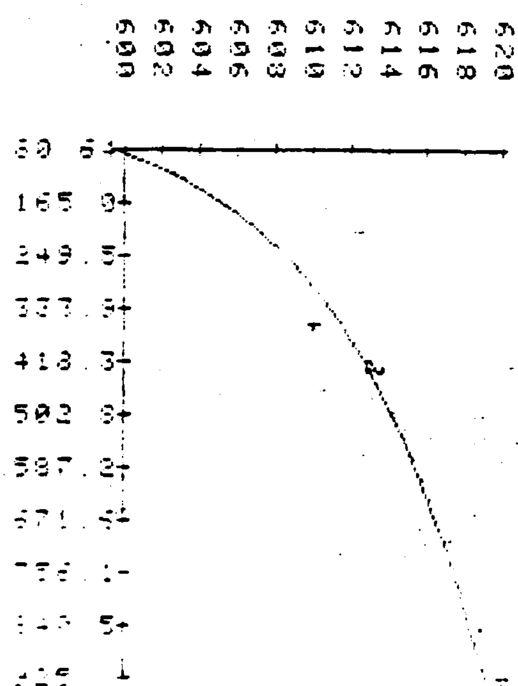
CURVE FITTING OF THE CAPACITY CURVE — Chkd. — Rev.

```
I          X(I)           Y(I)
1          80.6400        600.0000
2          360.6400       610.0000
3          925.0000       620.0000
  AOV: LOG REG CODE 2
SOURCE DF       SS        MS       F
TOTAL   2      200.0
REG     1      196.6     196.6   57.8
RESID   1        3.4       3.4
R SQUARE =            0.983

YHAT=    564.049+      8.058LOG X

  X(I)      Y(I)      YHAT    RESIDUALS

  80.64    600.00    599.42      0.58
 360.64    610.00    611.49     -1.49
 925.00    620.00    619.08      0.92
```



Client CORPS OF ENGINEERS Job No. 1345-072 -015 Sheet 2 of 23

Subject NOYES BROOK RESERVOIR By T. OTOVA Date 2-3-81

CAPACITY CURVE Ckd. Rev.

X(I)	YHAT
40.00	593.77
45.00	594.73
50.00	595.57
55.00	596.34
60.00	597.04
65.00	597.69
70.00	598.29
75.00	598.84
80.00	599.36
85.00	599.85
90.00	600.31
95.00	600.74
100.00	601.15
150.00	604.42
204.41	615.55
200.00	605.74
250.00	609.54
300.00	610.01
350.00	611.25
400.00	612.33
450.00	613.29
500.00	614.13
550.00	614.89
600.00	615.60
650.00	616.24
700.00	616.84
750.00	617.39
800.00	617.91
850.00	618.40
900.00	618.85
950.00	619.30
1000.00	619.71

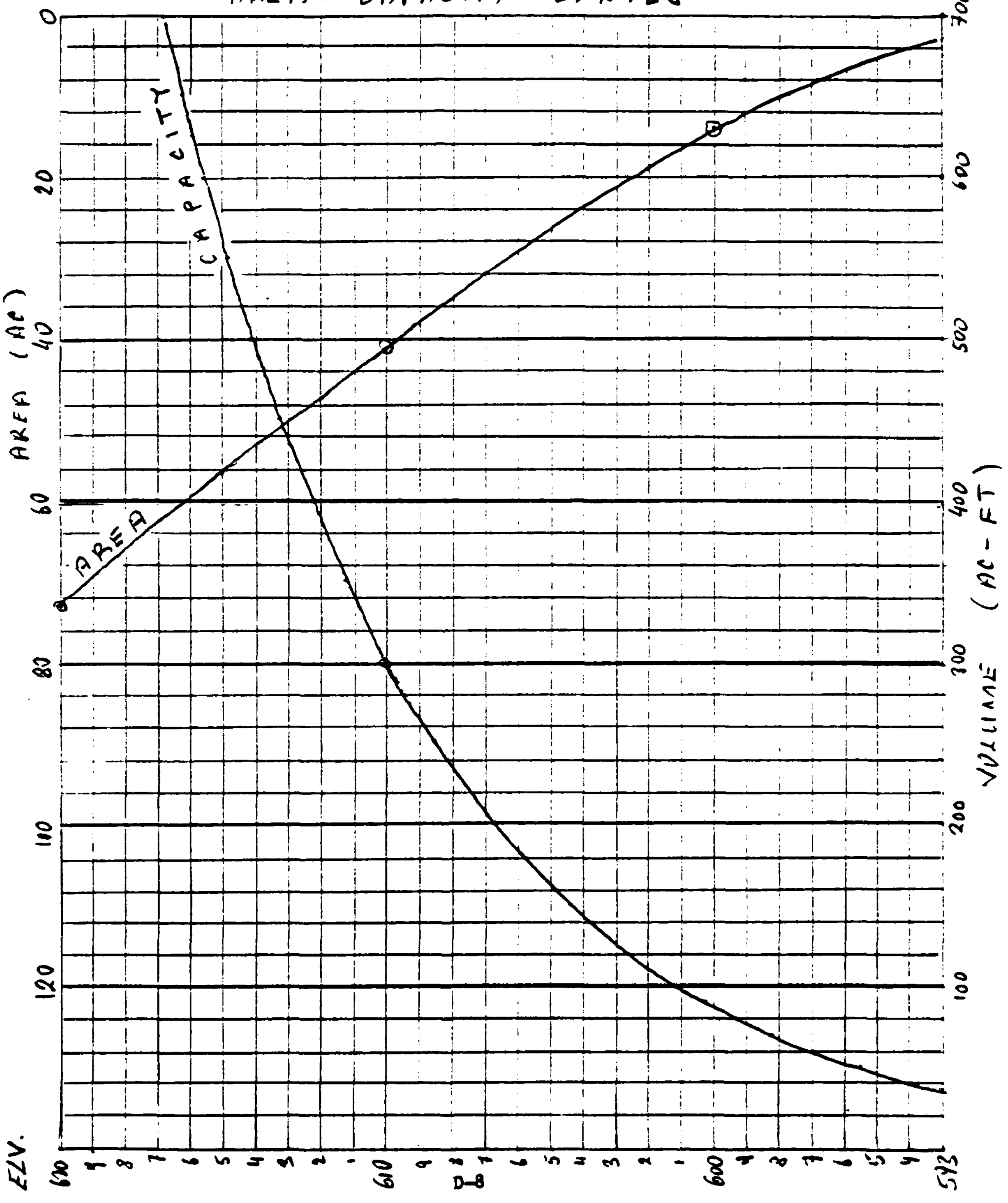
MAIN

Client CORPS OF ENGINEERS | Job No. 1345-072-015 | Sheet 3 of 23

Subject NINES BROOK RESERVOIR | By T. OTOVA | Date 2-3-81

AREA - CAPACITY CURVE | Ckd. | Rev.

AREA - CAPACITY CURVES



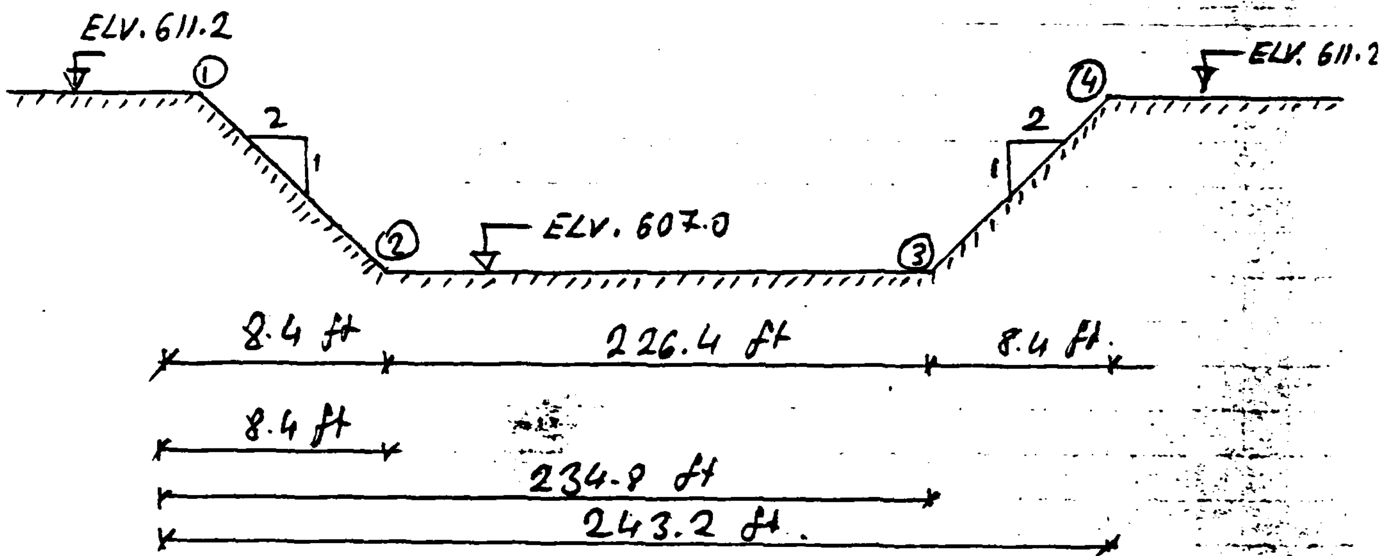
MAIN

Client CORPS OF ENGINEERS Job No. 1345-072-015 Sheet 4 of 23

Subject NOYES BROOK RESERVOIR By T. OTOVA Date 2-3-81

EMERGENCY SPILLWAY RATING CURVE Chd. Rev.

EMERGENCY SPILLWAY RATING CURVE



Open Channel Formula: $Q = \dfrac{1.49 \times A \times R^{2/3} \times S^{1/2}}{n}$

$n = 0.03$ (assumed)
$S = 0.01$ (averaged from the drawing)
(Computations based on open channel flow as being more conservative than the broad crested weir approach.)

SLOPE-AREA METHOD

NO OF CROSS-SEC. POINTS = 4

SLOPE = .01

EL(1)= 611.2
EL(2)= 607
EL(3)= 607
EL(4)= 611.2

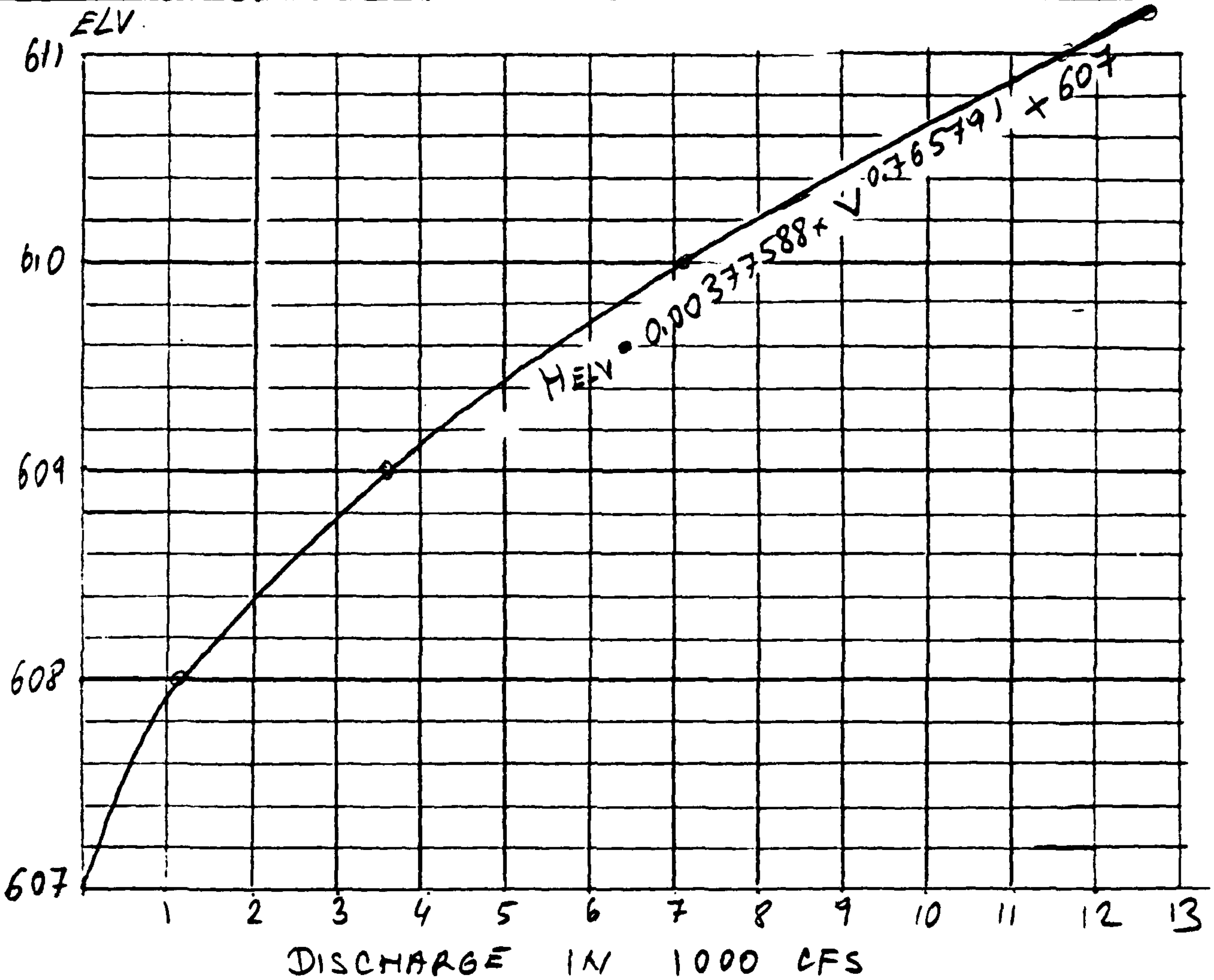
X(1)= 0
X(2)= 8.4
X(3)= 234.8
X(4)= 243.2

N(1)= .03
N(2)= .03
N(3)= .03

W S ELEV.	DISCHARGE
607	0
608	1130.3
609	3606.6
610	7125.6
611	11597.[illegible]
611.2	13560.[illegible]

MAIN

Client CORPS OF ENGINEERS Job No. B45-072-015 Sheet 5A of 23
Subject NOYES BROOK RESERVOIR By T. OTUVA Date 2-3-81
EMERGENCY SPILLWAY RATING CURVE Chkd. Rev.



EMERGENCY SPILLWAY RATING CURVE

MAIN

Client CORPS OF ENGINEERS   Job No. 1345-072 -015   Sheet 5B of 23
Subject NOYES BROOK DAM   By T.OTOVA   Date 2-3-81
PRINCIPAL SPILLWAY RATING TABLE   Chd.   Rev.

PRINCIPAL SPILLWAY

The formula used in these calculations is presented in the Bureau of reclamation's
DESIGN OF SMALL DAMS (1977)
Page 557,Figure B-10

Ht = [2.5204*(1+Ke)/D^4 +
466.18*n2*L/D^(16/3)]*(Q/10)^2

Where

Ht = Head in feet
Ke = Entrance loss coefficient
D = Diameter of pipe in feet
n = Mannings roughness coefficient
L = Lenght of culvert in feet
Q = Design discharge rate in cfs

Ke = .2

D = 2.5 (ft)

n = .01

L = 140 (ft)

ENTRANCE ELV = 594 (ft)

OUTLET ELV = 581 (ft)

ELEVATION (ft)	DISCHARGE (cfs)
605.82	140
606.18	141
606.54	142
606.9	143
607.26	144
607.63	145
608	146
608.37	147
608.74	148
609.12	149
609.5	150
609.88	151
610.26	152
610.65	153
611.04	154
611.43	155

MAIN

Client CORPS OF ENGINEERS Job No. 1345-072 -015 Sheet 6 of 23
Subject NOYES BROOK RESERVOIR By T.ITOVA Date 2-3-81
FLOOD ROUTING Ckd. Rev.

Drainage Area = 2.85 sq. mi.

For 19" runoff and for rolling terrain the PMF curves yield $q_{PMF} = 2000$ cfs/sq. mi.

Then,

$$Q_{PMF} = 2.85 \times 2000 = 5700 \text{ cfs}.$$

The Depth-Area-Duration curves for this part of MAINE show a 13" runoff.

The revised peak discharge,

$$Q_{PMF} = 5700 \times \frac{13}{19} = 3900 \text{ cfs}.$$

The test flood is selected to be 3900 cfs.

MAIN

Client: CORPS OF ENGINEERS — Job No. 1345-072-015 — Sheet 7 of 23

Subject: NOYES BROOK RESERVOIR — By T. OTOVA — Date 2-3-81

FLOOD ROUTING — Chkd. — Rev.

ESTIMATING

EFFECT OF SURCHARGE STORAGE

ON MAXIMUM PROBABLE DISCHARGES

These calculations are
performed according to the
Corps of Engineers
Guidelines

NOYES BROOK DAM

D A T A :

DRAINAGE AREA:
A= 2 25 (sq mi.)

PEAK INFLOW:
Qp1= 3300 (cfs)

PRINCIPAL SPILLWAY CREST ELEV.:
ELV1= 594 (ft.)

EMERGENCY SPILLWAY CREST ELEV.:
ELV2= 607 (ft.)

Emergency Spillway Rating Curve
is defined as :

H = a * Q ^ b

a = .00377588
b = .765791

The Capacity - Elv. curve
is defined as:

Elv = m + n * Log(Volume)

m= 554 049
n= 5 253

TOTAL PMF RUNOFF
R= 13 (in.)

CALCULATIONS:

S T E P 1

Reduction of the Qp1 due to
starting elevation at
Principal Spillway crest elev.

Volume at 594 (ft.)

Volume1 =Exp((ELV1-m)/n)
Volume1 = 41 137 (ac-ft)

Volume at 607 (ft.)

Volume2 =Exp((ELV2-m)/n)
Volume2 = 206.485 (ac-ft)

Diff. of Volumes:

Diff.Volume = 165.347 (ac-ft)
or:
Diff Volume: D= 1.08 (in.)

NEW Qp1=Qp1*(1-D/R)
NEW Qp1 = 3573 (cfs)

S T E P 2

Surcharge Height:

H = a * Qp1 ^ b
H = 1 98 (ft.)

Surcharge Volume:

ELV=ELV2 + H
ELV= 608.98 (ft.)

Volume = 264 193 (ac-ft)

STOR1 =Volume - Volume2

STOR1 = 57.708 (ac-ft)
or
STOR1 = .37 (in.)

MAIN

Client: CORPS OF ENGINEERS — Job No. 1345-072-015 — Sheet 8 of 23

Subject: NOYES BROOK RESERVOIR FLOOD ROUTING — By T. OTOVA — Date 2-3-81

Ckd. ____ Rev. ____

Corresponding Discharge.

Qp2 = Qp1*(1-STOR1/R)
Qp2 = 3469 (cfs)

S T E P 3

Surcharge Height.

H = a * Qp2 ^ b
H = 1.94 (ft.)

Surcharge Volume(STOR2)

ELV = ELV2 + H
ELV = 608.94 (ft.)

Volume = 262.736 (ac-ft)

Diff Volume = Volume - Volume2
Diff Volume = 56.25 (ac-ft)

STOR2 = .37 (in.)

OLD STOR.AVE.= (STOR1 + STOR2) / 2

OLD STOR.AVE = .37 (in.)

Qp3 =Qp1*(1 - OLD STO.AVE. / R

Qp3 = 3470 (cfs)

S T E P 4

Surcharge Height

H3 = a * Qp3 ^ b
H3 = 1.94 (ft.)

Diff Volume(STOR3)

E1 = H3 + H2
E1 = 608.94 (cfs)
Volume = E*(E1-m)^n
Volume = 262.755 (ac-ft)

STOR3 = Volume - Volume2
STOR3 = 56.269 (ac-ft)

STOR3 = .37 (in.)

NEW STO AVE.= (OLD STO AVE. + STOR3) / 2
NEW STO AVE.= .37 (in.)

Qp4 = Qp1 * (1 - NEW STO.AVE. / R)
Qp4 = 3471 (cfs)

Surcharge Height

H4 = a * Qp4 ^ b
H4 = 1.94 (ft.)

E2 = H4 + H2
E2 = 608.94 (ft.)

C H E K I N G :

E3 - E2 = 0 (ft.)

R E S U L T S :

AVERAGED DISCHARGE= 3470 (cfs)

WATER SURFACE ELEV.= 608.94 (ft.)

SURCHARGE HEIGHT = 1.94 (ft.)

CREST ELEV. OF THE DAM:
Ec= 611.2 (ft.)

VOLUME AT DAM CREST ELEV.
Vc = 347.738 (ac-ft)

VOLUME AT MAX.WATER SURFACE ELEV.

Vw = 262.759 (ac-ft)

MAIN

Client: CORPS OF ENGINEERS Job No. 1345-032-015 Sheet 9 of 23
Subject: NOYES BROOK DAM By T. OTOKA Date 2-3-81
FAILURE ANALYSES Chkd. Rev.

NOYES BROOK
DAM FAILURE ANALYSES

These calculations are performed according to the RULE OF THUMB procedures of the Corps of Engineers

The breach discharge:
Qp1 = 8/27 * Wb * g^0.5 * Yo^3/2

where

Yo is the height of the breach (from river bed to the max. pool level

Wb is 35% of the length of the dam, or Wb = .35 * L

g is the acceleration of the gravity (32.2 ft/sec^2)

Yo = 28.9 (ft)

L = 910 (ft)

Wb = 318 (ft)

From above equation,
Qp1 = 83137 (cfs)

The natural channel cross sections are simplified as triangular cross sections

The stage-discharge relationship becomes as,

h = [1.068 * n * Tan(a) * Q / Cos(a)^2/3 / S^.5]^3/8 .... (I)

Where,

Q = Discharge (cfs)
a = Side slope angle (deg)
S = Channel slope

The cross section Area

A = h^2 / Tan(a) .....(II)

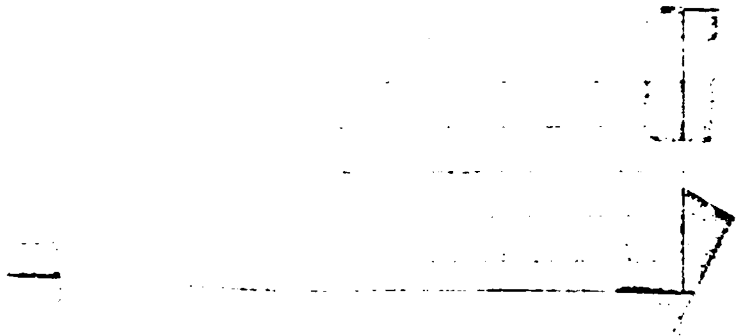
The Volume of the Reservoir
V = 262.759 (ac-ft)
or
V = 11445782.04 (cub-ft)

MAIN

Client CORPS OF ENGINEERS Job No. 1345-072-015 Sheet 14 of 23

Subject NOYES BROOK DAM By T. OTOVA Date 2-3-81

FAILURE ANALYSES Chkd. Rev.



R E A C H (5) CALCULATIONS

Test flood discharge
Qf = 1000 (cfs)

a = 5 (deg.)
S = .0125
n = .07
L = 300 (ft)

From Formula (I),

Prefailure height,

h1 = 4.6 (ft)

From Formula (II),

A1 = 242 (sq.ft.)

Q = Qp1 + Qf

From Formula (I),
Total Height,
h = 19.2 (ft)

From Formula (II),
Total Area,
A = 4240 (sq-ft)

Residual Area,
A2 = A - A1
A2 = 3998 (sq-ft)

Residual Volume,

V1 = L * A2

V1 = 1199506 (cub-ft)

Qp2 = Qp1 * (1 - V1 / S)

Qp2 = 39794 (cfs)

From Formula (I),

Q=Qp2+Qf

Q = 40794 (cfs)

h = 18 (ft)

From Formula (II),

A = 3910 (ft)

Residual Area,

A2 = A - A1

A2 = 3668 (ft)

V2 = A2 * L

V2 = 1100404 (cub-ft)

Vave = (V1 + V2) / 2

Vave = 1149955 (cub-ft)

Qp2 = Qp1 * (1 - Vave / S)

Qp2 = 38987 (cfs)

From Formula (I),

Q = Qp2 + Qf

h2 = 18.5 (ft)

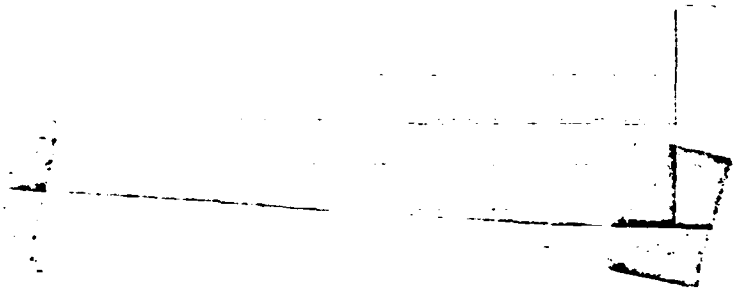
RESULTS :
----

1) Prefailure Height = 4.6 (ft)

2) Postfailure Height = 18.5 (ft)

3) Breach Discharge = 38987 (cfs)

4) Reach Length = 300 ft



REACH (6) CALCULATIONS

Test flood discharge
Qt = 1000 (cfs)

a = 5 (deg.)
S = .0143
n = .07
L = 300 (ft)

From Formula (I),

Prefailure height,

h1 = 4.4 (ft)

From Formula (II),

A1 = 230 (sq.ft.)

Q = Qp1 + Qt

From Formula (I),
Total Height,
h = 18 (ft)

From Formula (II),
Total Area,
A = 3731 (sq-ft)

Residual Area,
A2 = A - A1
A2 = 3500 (sq-ft)

Residual Volume,

V1 = L * A2

V1 = 1050210 (cub-ft)

Qp2 = Qp1 * (1 - V1 / V)

Qp2 = 36318 (cfs)

From Formula (I),

Q=Qp2+Qt

Q = 37318 (cfs)

h = 17 (ft)

From Formula (II),

A = 3477 (ft)

Residual Area,

A2 = A - A1

A2 = 3247 (ft)

V2 = A2 * L

V2 = 974189 (cub-ft)

Vave = (V1 + V2) / 2

Vave = 1012199 (cub-ft)

Qp2 = Qp1 * (1 - Vave / V)

Qp2 = 36451 (cfs)

From Formula (I),

Q = Qp2 + Qt

h2 = 17.4 (ft)

RESULTS

1.) Prefailure Height = 4.4 (ft)

2.) Postfailure Height = 17.4 (ft)

3.) Breach Discharge = 36451 (cfs)

4.) Reach Length = 300 (ft)

MAIN

Client ______ Job No. ______ Sheet 16 of 23

Subject ______ By ______ Date 2-3-81

Chd. ______ Rev. ______

REACH (7) CALCULATIONS

Test flood discharge
Qt = 1000 (cfs)

a = 3.77 (deg.)
S = .0143
n = .07
L = 300 (ft)

From Formula (I),

Prefailure height,

h1 = 4 (ft)

From Formula (II),

A1 = 247 (sq.ft.)

Q = Qp1 + Qt

From Formula (I),
Total Height,
h = 15.6 (ft)

From Formula (II),
Total Area,
A = 3739 (sq-ft)

Residual Area,
A2 = A - A1
A2 = 3492 (sq-ft)

Residual Volume,

V1 = L * A2

V1 = 1047855 (cub-ft)

Qp2 = Qp1 * (1 - V1 / V)

Qp2 = 33114 (cfs)

From Formula (I),

Q=Qp2+Qt

Q = 34114 (cfs)

h = 15 (ft)

From Formula (II),

A = 3487 (ft)

Residual Area,

A2 = A - A1

A2 = 3240 (ft)

V2 = A2 * L

V2 = 972007 (cub-ft)

Vave = (V1 + V2) / 2

Vave = 1009931 (cub-ft)

Qp2 = Qp1 * (1 - Vave / V)

Qp2 = 33234 (cfs)

From Formula (I),

Q = Qp2 + Qt

h2 = 15.1 (ft)

RESULTS

1.) Prefailure Height = 4 (ft)

2.) Postfailure Height = 15.1 (ft)

3.) Breach Discharge = 33234 (cfs)

4.) Reach Length = 300 (ft)

MAIN

Client ______ Job No. ______ Sheet 17 of 23

Subject ______ By ______ Date 2-3-81

Chkd. ______ Rev. ______

R E A C H (8) CALCULATIONS

Test flood discharge:
Qt = 1000 (cfs)

s = 3 (deg)
S = .014
n = .07
L = 300 (ft)

From Formula (I),

Prefailure height,

h1 = 3.7 (ft)

From Formula (II) ,

A1 = 263 (sq.ft.)

Q = Qp1 + Qt

From Formula (I),
Total Height,
h = 13.9 (ft)

From Formula (II),
Total Area,
A = 3730 (sq-ft)

Residual Area,
A2 = A - A1
A2 = 3466 (sq-ft)

Residual Volume,

V1 = L * A2

V1 = 1040043 (cub-ft)

Qp2 = Qp1 * (1 - V1 / S)

Qp2 = 30214 (cfs)

From Formula (I),

Q=Qp2+Qt

Q = 31214 (cfs)

h = 13 (ft)

From Formula (II),

A = 3480 (ft)

Residual Area,

A2 = A - A1

A2 = 3217 (ft)

V2 = A2 * L

V2 = 965155 (cub-ft)

Vave = (V1 + V2) / 2

Vave = 1002599 (cub-ft)

Qp2 = Qp1 * (1 - Vave / S)

Qp2 = 30323 (cfs)

From Formula (I),

Q = Qp2 + Qt

h2 = 13.5 (ft)

RESULTS :

1) Prefailure Height = 3.7 (ft)

2) Postfailure Height = 13.5 (ft)

3) Breach Discharge = 30323 (cfs)

4) Reach Length = 300 (ft)

MAIN

Client ________ Job No. ________ Sheet 18 of 23

Subject ________ By ________ Date 2-3-81

Ckd. ________ Rev. ________

R E A C H (9) CALCULATIONS

Test flood discharge
Qt = 1000 (cfs)

s = 3.2 (deg)
S = .0135
n = .07
L = 300 (ft)

From Formula (I),

Prefailure height,

h1 = 3.8 (ft)

From Formula (II),

A1 = 262 (sq.ft)

Q = Qp1 + Qt

From Formula (I),
Total Height,
h = 13.9 (ft)

From Formula (II),
Total Area,
A = 3431 (sq-ft)

Residual Area,
A2 = A - A1
A2 = 1218 (sq-ft)

Residual Volume,

V1 = L * A2

V1 = 365529 (cub-ft)

Qp2 = Qp1 * (1 - V1 / S

Qp2 = 27765 (cfs)

From Formula (I),

Q=Qp2+Qt

Q = 28765 (cfs)

h = 13 (ft)

From Formula (II),

A = 3265 (ft)

Residual Area,

A2 = A - A1

A2 = 3003 (ft)

V2 = A2 * L

V2 = 900885 (cub-ft)

Vave = (V1 + V2) / 2

Vave = 633207 (cub-ft)

Qp2 = Qp1 * (1 - Vave / S

Qp2 = 27851 (cfs)

From Formula (I),

Q = Qp2 + Qt

h2 = 13.5 (ft)

RESULTS
----

1) Prefailure Height = 3.8 (ft)

2) Postfailure Height = 13.5 (ft)

3) Breach Discharge = 27851 (cfs)

4) Reach Length = 300 (ft)

MAIN

Client ______ Job No. ______ Sheet 19 of 23

Subject ______ By ______ Date 2-3-81

Chk. ______ Rev. ______

REACH (10) CALCULATIONS

Test flood discharge:
Qt = 1000 (cfs)

a = 3.23 (deg.)
S = .01
n = .07
L = 300 (ft)

From Formula (I),

Prefailure height,

h1 = 4 (ft)

From Formula (II),

A1 = 293 (sq.ft.)

Q = Qp1 + Qt

From Formula (I),
Total Height,
h = 14.3 (ft)

From Formula (II),
Total Area,
A = 3657 (sq-ft)

Residual Area,
A2 = A - A1
A2 = 3363 (sq-ft)

Residual Volume,

V1 = L * A2

V1 = 1009075 (cub-ft)

Qp2 = Qp1 * (1 - V1 / V)

Qp2 = 25395 (cfs)

From Formula (I),

Q=Qp2+Qt

Q = 26395 (cfs)

h = 13 (ft)

From Formula (II),

A = 3421 (ft)

Residual Area,

A2 = A - A1

A2 = 3127 (ft)

V2 = A2 * L

V2 = 938268 (cub-ft)

Vave = (V1 + V2) / 2

Vave = 973672 (cub-ft)

Qp2 = Qp1 * (1 - Vave / V)

Qp2 = 25481 (cfs)

From Formula (I),

Q = Qp2 + Qt

h2 = 13.8 (ft)

RESULTS :

1.) Prefailure Height = 4 (ft)

2.) Postfailure Height = 13.8 (ft)

3.) Breach Discharge = 25481 (cfs)

4.) Reach Length = 300 (ft)

Sheet 20 of 23
Date 2-7-81

BREACH (11) CALCULATIONS

Test flood discharge.
Qf = 1000 (cfs)

a = 2.55 (deg.)
f = .01
n = .07
L = 300 (ft)

From Formula (I),

Prefailure height,

h1 = 3.7 (ft)

From Formula (II),

A1 = 311 (sq ft.)

Q = Qp1 + Qf

From Formula (I),
Total Height,
h = 12.7 (ft)

From Formula (II),
Total Area,
A = 3634 (sq-ft)

Residual Area,
A2 = A - A1
A2 = 3323 (sq-ft)

Residual Volume,

V1 = L * A2

V1 = 997083 (cub-ft)

Qp2 = Qp1 * (1 - V1 / V)

Qp2 = 23262 (cfs)

From Formula (I),

Q=Qp2+Qf

Q = 24262 (cfs)

h = 12 (ft)

From Formula (II),

A = 3403 (ft)

Residual Area,

A2 = A - A1

A2 = 3092 (ft)

V2 = A2 * L

V2 = 927781 (cub-ft)

Vave = (V1 + V2) / 2

Vave = 962432 (cub-ft)

Qp2 = Qp1 * (1 - Vave / V)

Qp2 = 23339 (cfs)

From Formula (I),

Q = Qp2 + Qf

h2 = 12.3 (ft)

RESULTS :
----

1) Prefailure Height = 3.7 (ft)

2) Postfailure Height = 12.3 (ft)

3) Breach Discharge = 23339 (cfs)

4) Reach Length = 300 (ft)

MAIN

Client ______ Job No. ______ Sheet 21 of 23

Subject ______ By ______ Date 2-3-81

Chkd. ______ Rev. ______

R E A C H (12) CALCULATIONS

Test flood discharge.
Qt = 1000 (cfs)

[illegible] = 2.35 (deg.)
[illegible] = .01
[illegible] = .07
L = 300 (ft)

From Formula (I).

Prefailure height.

h1 = 3.6 (ft)

From Formula (II).

A1 = 317 (sq.ft.)

Q = Qp1 + Qt

From Formula (I).
Total Height.
h = 11.9 (ft)

From Formula (II).
Total Area.
A = 3482 (sq-ft)

Residual Area.
A2 = A - A1
A2 = 3164 (sq-ft)

Residual Volume.

V1 = L * A2

V1 = 949357 (cub-ft)

Qp2 = Qp1 * (1 - V1

Qp2 = 21403 (cfs)

From Formula (I).

Q=Qp2+Qt

Q = 22403 (cfs)

h = 11 (ft)

From Formula (II).

A = 3272 (ft)

Residual Area.

A2 = A - A1

A2 = 2954 (ft)

V2 = A2 * L

V2 = 886399 (cub-ft)

Vave = (V1 + V2) / 2

Vave = 917878 (cub-ft)

Qp2 = Qp1 * (1 - Vave / V)

Qp2 = 21467 (cfs)

From Formula (I).

Q = Qp2 + Qt

h2 = 11.6 (ft)

RESULTS :
----

1) Prefailure Height = 3.6 (ft)

2) Postfailure Height = 11.6 (ft)

3) Breach Discharge = 21467 (cfs)

4) Reach Length = 300 (ft)

MAIN

Client ______ Job No. ______ Sheet 22 of 23

Subject ______ By ______ Date 2-3-81

Ckd. ______ Rev. ______

R E A C H (13) CALCULATIONS

Test flood discharge,
Qt = 1000 (cfs)

s = 2.35 (deg.)
f = .01
n = .07
L = 300 (ft)

From Formula (I),

Prefailure height,

h1 = 3.5 (ft)

From Formula (II),

A1 = 317 (sq.ft.)

Q = Qp1 - Qt

From Formula (I),
Total Height,
h = 11.5 (ft)

From Formula (II),
Total Area,
A = 3279 (sq-ft)

Residual Area,
A2 = A - A1
A2 = 2961 (sq-ft)

Residual Volume,

V1 = L * A2

V1 = 888300 (cub-ft)

Qp2 = Qp1 * (1 - V1 / ...)

Qp2 = 19801 (cfs)

From Formula (I),

Q=Qp2+Qt

Q = 20801 (cfs)

h = 11 (ft)

From Formula (II),

A = 3095 (ft)

Residual Area,

A2 = A - A1

A2 = 2777 (ft)

V2 = A2 * L

V2 = 833253 (cub-ft)

Vave = (V1 + V2) / 2

Vave = 860880 (cub-ft)

Qp2 = Qp1 * (1 - Vave / ...)

Qp2 = 19852 (cfs)

From Formula (I),

Q = Qp2 + Qt

h2 = 11.2 (ft)

RESULTS

1.) Prefailure Height = 3.5 (ft)

2.) Postfailure Height = 11.2 (ft)

3.) Breach Discharge = 19851 (cfs)

4.) Reach Length = 300 (ft)

MAIN

Client ______ Job No. ______ Sheet 23 of 23
Subject ______ By ______ Date 2-3-81
Ckd. ______ Rev. ______

R E A C H (14) CALCULATIONS

Test flood discharge,
Qt = 1000 (cfs)

a = 2.35 (deg.)
S = .01
n = .07
L = 300 (ft)

From Formula (I),

Prefailure height,

h1 = 3.6 (ft)

From Formula (II),

A1 = 317 (sq.ft.)

Q = Qp1 + Qt

From Formula (I),
Total Height,
h = 11.2 (ft)

From Formula (II),
Total Area,
A = 3101 (sq-ft)

Residual Area,
A1 = A - A1
A1 = 2783 (sq-ft)

Residual Volume,

V1 = L * A1

V1 = 834999 (cub-ft)

Qp2 = Qp1 * (1 - V1 / V)

Qp2 = 18404 (cfs)

From Formula (I),

Q=Qp2+Qt

Q = 19404 (cfs)

h = 10 (ft)

From Formula (II),

A = 2938 (ft)

Residual Area,

A2 = A - A1

A2 = 2620 (ft)

V2 = A2 * L

V2 = 786094 (cub-ft)

Vave = (V1 + V2) / 2

Vave = 810541 (cub-ft)

Qp2 = Qp1 * (1 - Vave / V)

Qp2 = 18447 (cfs)

From Formula (I),

Q = Qp2 + Qt

h2 = 10.9 (ft)

RESULTS :

1.) Prefailure Height = 3.6 (ft)

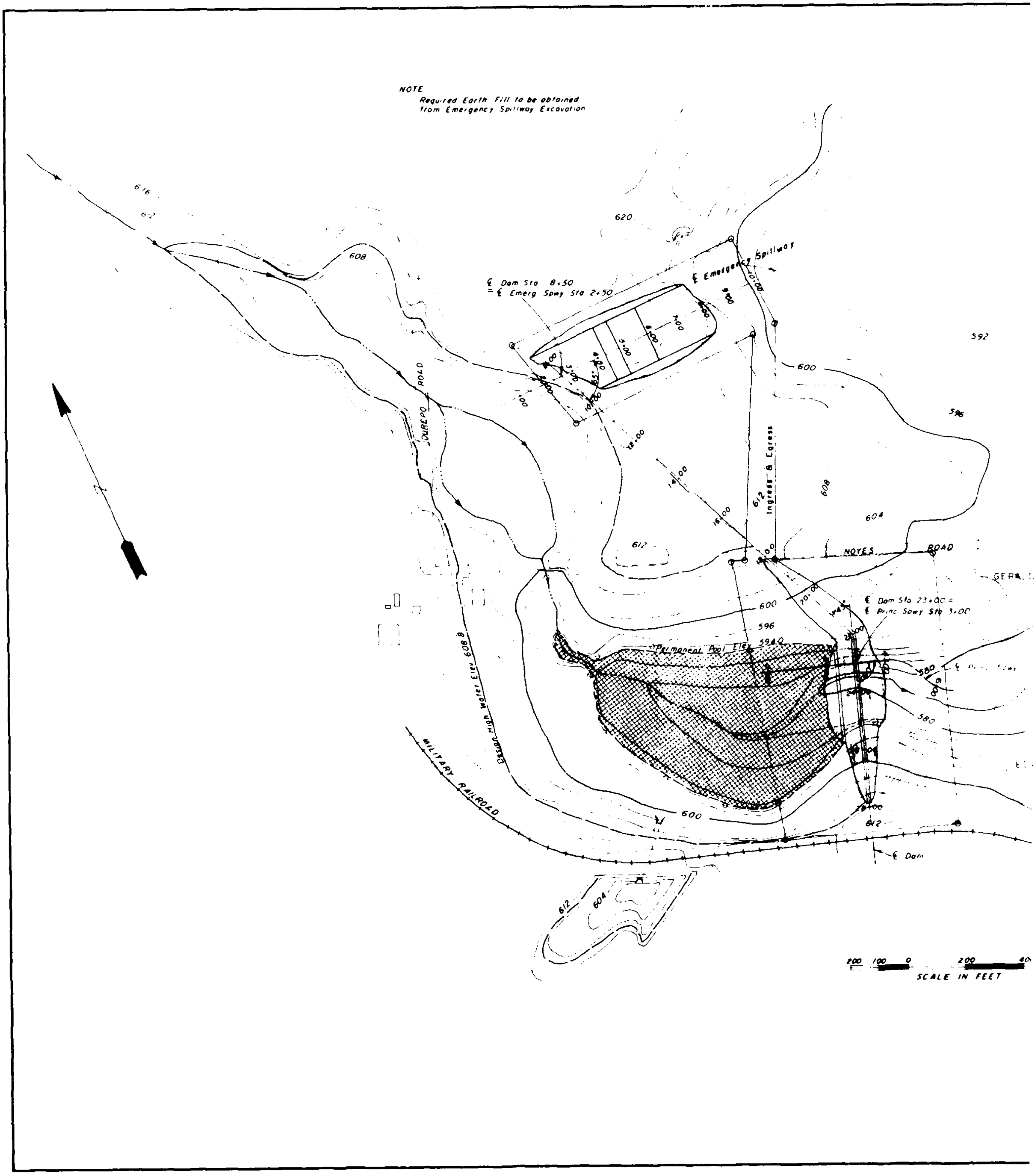
2.) Postfailure Height = 10.9 (ft)

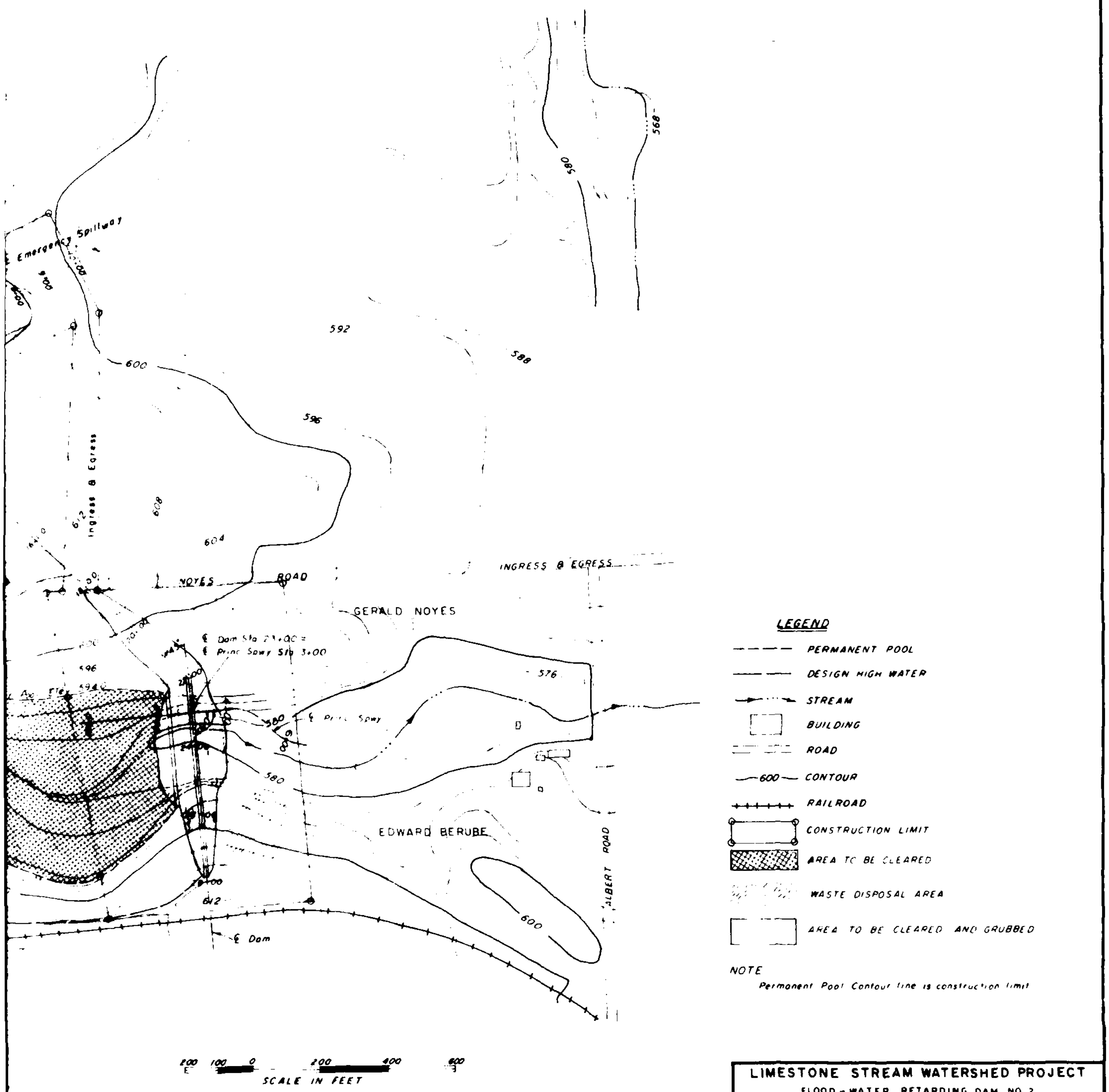
3.) Breach Discharge = 18447 (cfs)

4.) Reach Length = 300 (ft)

APPENDIX E

NATIONAL INVENTORY OF DAMS


NOTE
Required Earth Fill to be obtained from Emergency Spillway Excavation
℄ Dam Sta 8+50
= ℄ Emerg Spwy Sta 2+50
℄ Emergency Spillway
Ingress & Egress
NOYES ROAD
DUREPO ROAD
MILITARY RAILROAD
Design High Water Elev 608.8
Permanent Pool Elev 594.0
℄ Dam Sta 23+00 =
℄ Princ Spwy Sta 3+00
℄ Dam
SCALE IN FEET



LIMESTONE STREAM WATERSHED PROJECT

FLOOD-WATER RETARDING DAM NO 2

NOYES BROOK

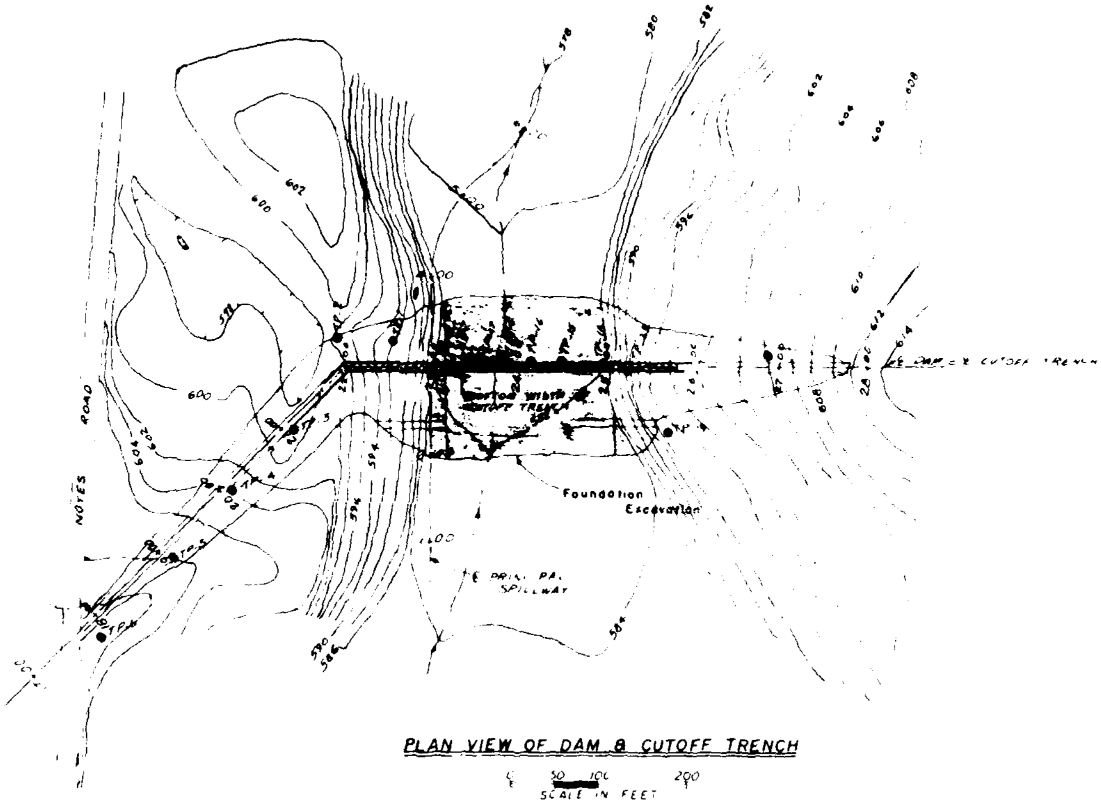
LIMESTONE, MAINE

PLAN OF STORAGE AND BORROW AREA

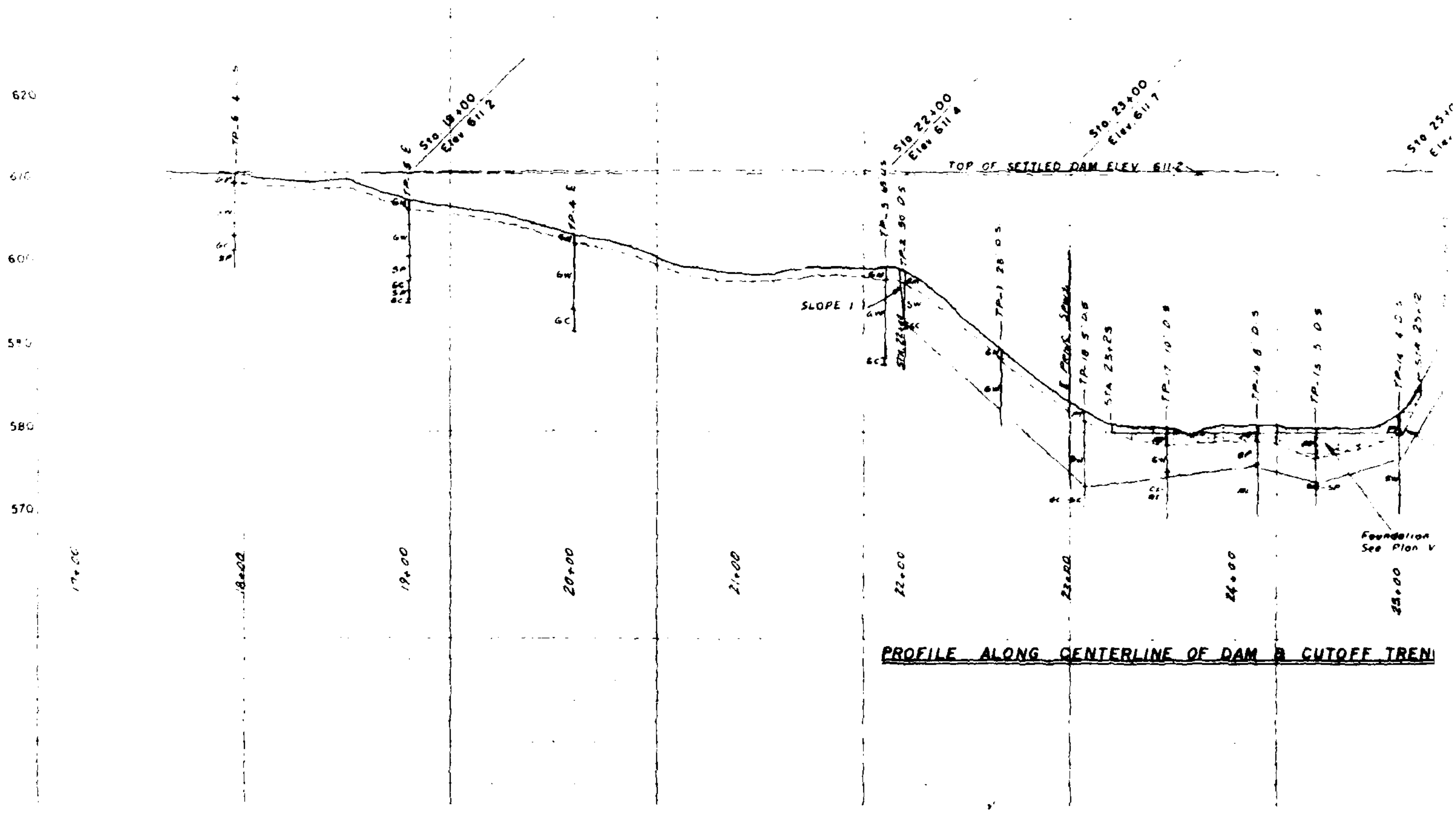
U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

		Date	
Designed	F JAGELS	3-68	Approved by
Drawn	M ATLAS	4-68	
Traced			Sheet No. 2 of 18
Checked	R A H	4/68	Drawing No. ME-503-P

SCS-313-C (9-64)



PLAN VIEW OF DAM & CUTOFF TRENCH



PROFILE ALONG CENTERLINE OF DAM & CUTOFF TRENCH

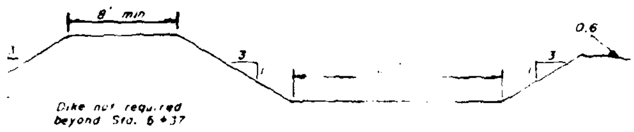
2

EARTH FILL REQUIREMENTS							
ZONE	MATERIAL	SOURCE	MAX ROCK SIZE	MAX LIFT ● THICKNESS	REQUIRED WATER CONTENT	COMPACTION	
						CLASS	DIFINITION
1	Materials or mixtures of materials from Emergency spillway excavation excluding such clean gravelly sands as are represented by samples from the 3-6 and 10-12+ depths of TP 203	Emergency Spillway Excavation	6"	9	Min water content = optimum at 100% standard density	A	95% of maximum density as determined by ASTM D-698 Method D
2	Materials or mixtures of materials from Emergency spillway excavation.	Emergency Spillway Excavation	6"	9"	Min water content = optimum at 100% standard density	A	95% of maximum density as determined by ASTM D 698 Method D

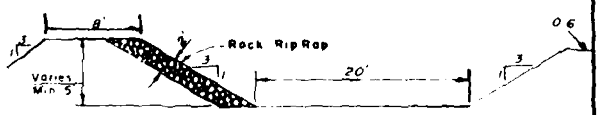
● Maximum lift thickness prior to Compaction

NOTE

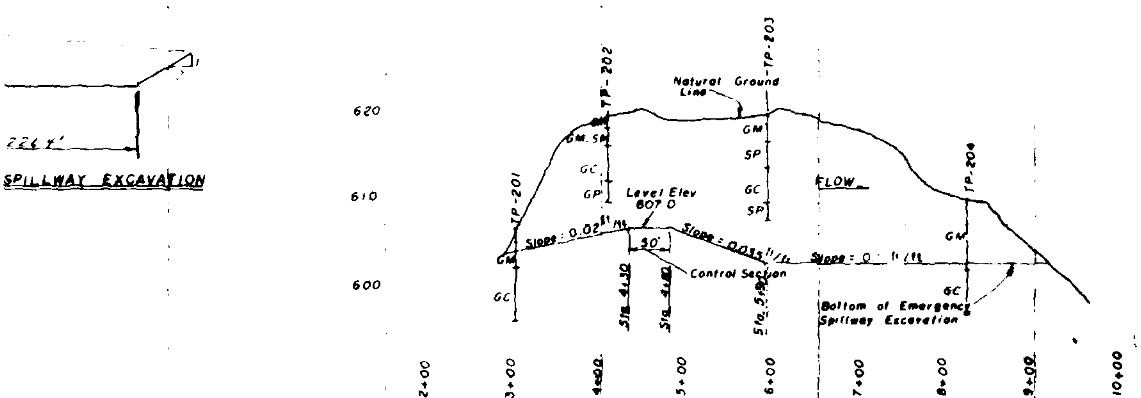
1 See sheets 17 and 18 for Test Pits
2 The foundation surface (See Middle Creek)
3 For fill adjacent to structures, Max Rock Size: 3"



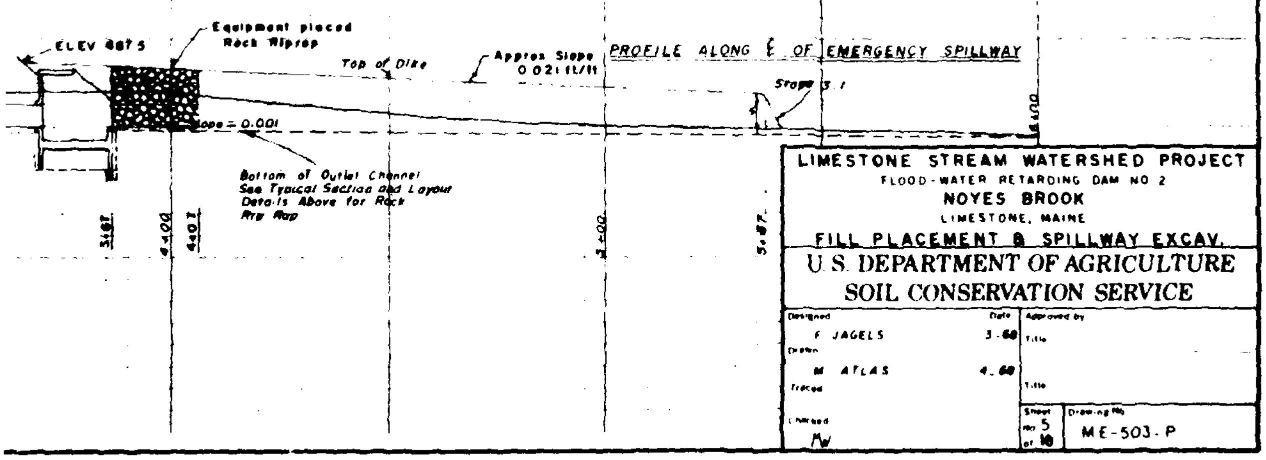
OUTLET CHANNEL DIKE SECTION
Sta 3+87 – 5+37



OUTLET CHANNEL ROCK RIP RAP (Equipment Placed)
Sta 3+87 – 4+07

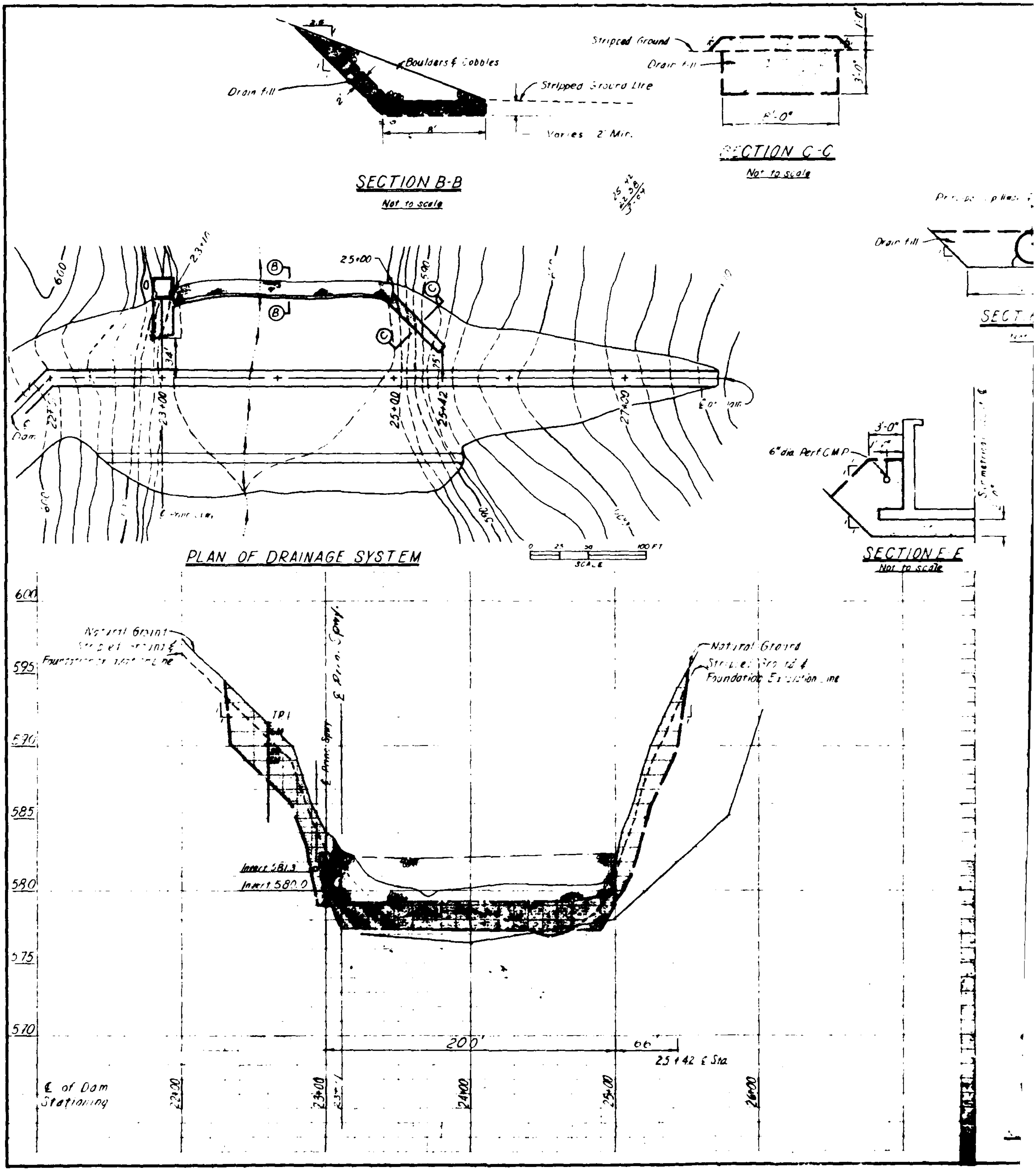


PROFILE ALONG ℄ OF EMERGENCY SPILLWAY

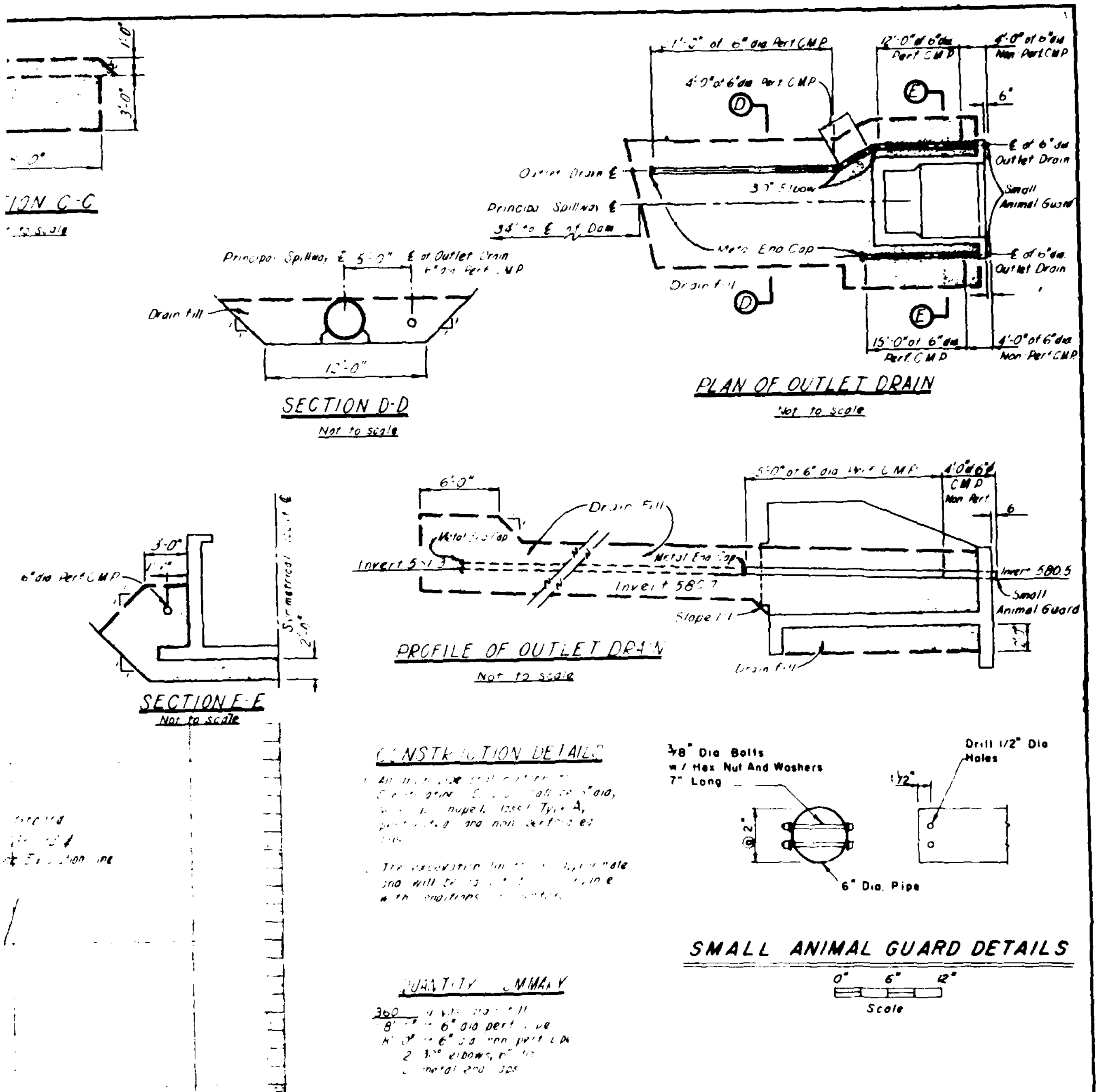


LIMESTONE STREAM WATERSHED PROJECT		
FLOOD-WATER RETARDING DAM NO 2		
NOYES BROOK		
LIMESTONE, MAINE		
FILL PLACEMENT & SPILLWAY EXCAV.		
U.S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE		
Designed F. JAGELS	Date 3-68	Approved by / Title
Drawn M. ATLAS	4-68	Title
Traced		
Checked MW	Sheet No 5 of 18	Drawing No ME-503-P

Form SCS-317 (November 1958)



Boulders & Cobbles
Drain fill
Stripped Ground Line
Varies 2' Min.
8'
SECTION B-B
Not to scale
Stripped Ground
Drain fill
1'-0"
3'-0"
8'-0"
SECTION C-C
Not to scale
Drain fill
23+00
25+00
25+42
27+00
600
590
PLAN OF DRAINAGE SYSTEM
0
25
50
100 FT
SCALE
3'-0"
6" dia Perf CMP
SECTION E-E
Not to scale
600
595
590
585
580
575
570
Natural Ground
TP1
℄ Prin. Spwy.
Natural Ground
Stripped Ground &
Foundation Excavation Line
Invert 581.3
Invert 580.0
200'
66'
25+42 ℄ Sta
℄ of Dam
Stationing
22+00
23+00
24+00
25+00
26+00



DRAIN FILL GRADATION	
SIEVE NO	% PASSING
3"	100
1"	82-100
½"	[illegible]-92
⅜"	59-86
No 4	43-71
No 8	[illegible]8-55
No 16	[illegible]-39
No 30	[illegible]-25
No 50	[illegible]
No 100	0-5

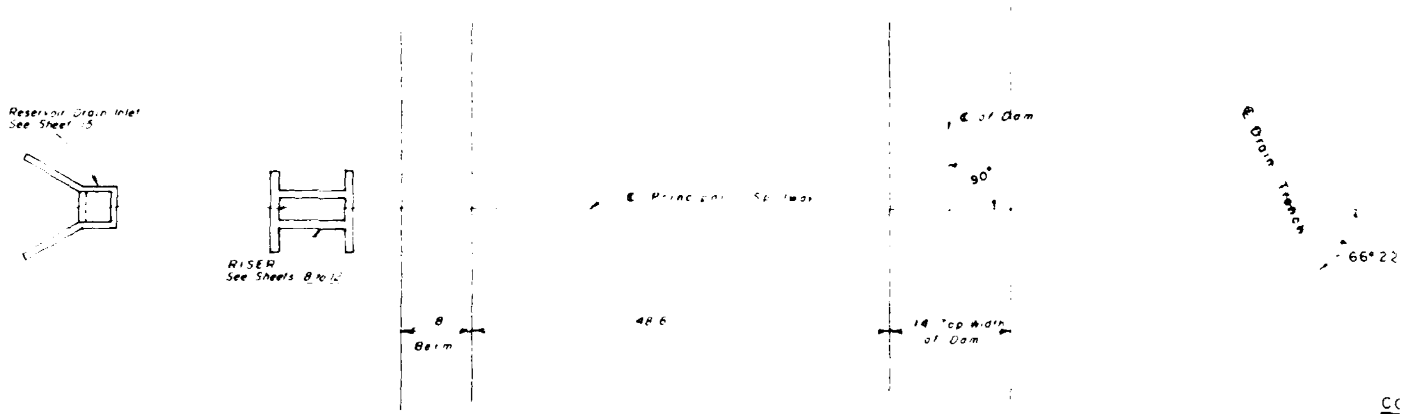
NOTE: [illegible]% of the material used [illegible] be larger than [illegible]

Revised M. White 3/69. Rev drawn by E. Snow 3/69

LIMESTONE STREAM WATERSHED PROJECT
FLOOD-WATER RETARDING DAM NO 2
NOYES BROOK
LIMESTONE, MAINE
DRAINAGE DETAILS

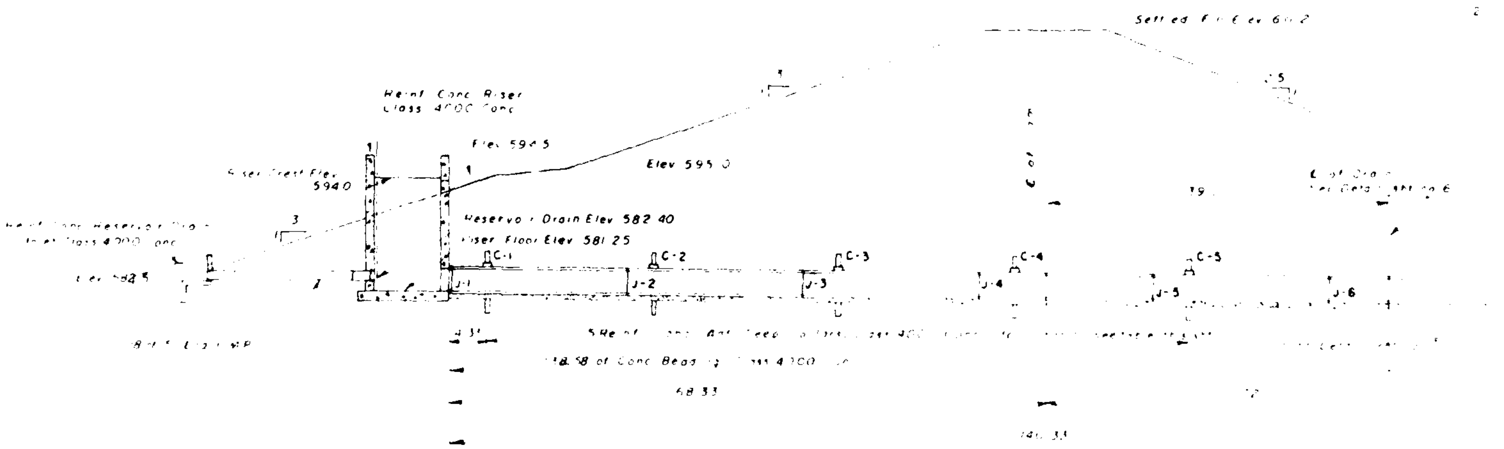
U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

Designed R. A. HYATT	Date 9-68	Approved by
Drawn R. L. ALLEN	9-68	Title
Traced		Title
Checked	9/68	Sheet No 6 of 10 — Drawing No ME-503-P



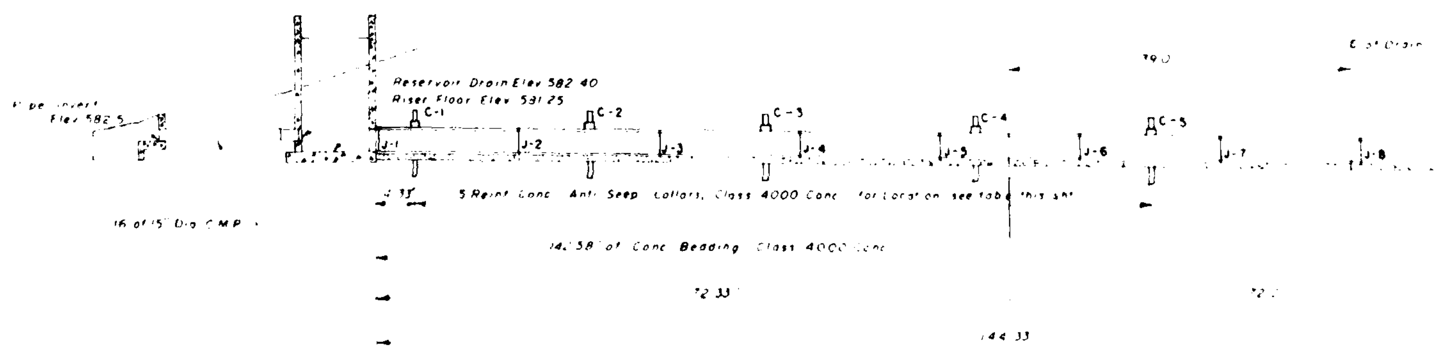
PLAN VIEW

0 5 0 10 20
Scale in Feet



ALTERNATE "A"

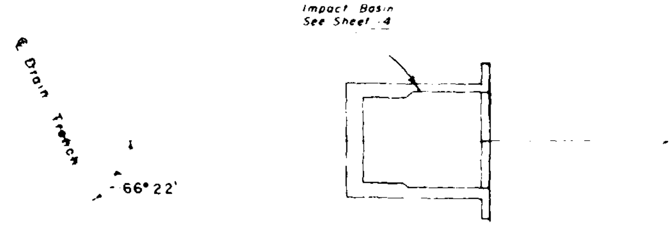
PROFILE ALONG ℄ OF PRINCIPAL SPILLWAY



ALTERNATE "B"

PROFILE ALONG ℄ OF PRINCIPAL SPILLWAY

2

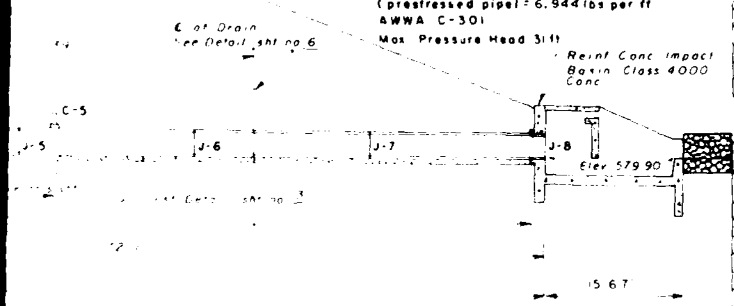


CONSTRUCTION DETAILS:

1 30" inside Dia Reinf Conc Water Pipe - Spec 109
  a (7) 20'-0" Sections - 140'-0" (Alternate "A")
    (1) Wall Fitting For 10" Wall

  b (9) 16'-0" Sections - 144'-0" (Alternate "B")
    (1) Wall Fitting For 10" Wall

2 Load for A or B
  Load = 19,423 lbs per lin ft based on O.D. of 3.08 ft
  Min 3 edge bearing strength for 0.01" crack (non-prestressed pipe) = 9,235 lbs per ft AWWA C-300
  Min 3 edge bearing strength for 0.001" crack (prestressed pipe) = 6,944 lbs per ft AWWA C-301
  Max Pressure Head 31 ft



ALTERNATE "A" 20' SECTIONS		
JOINT	DISTANCE FROM RISER	INVERT ELEV OF CONDUIT
J-1	0 33	581 25
J-2	20 33	581.06
J-3	40 33	580 86
J-4	60 33	580.67
J-5	80 33	580 48
J-6	100 33	580 29
J-7	120 33	580 09
J-8	140 33	579 90

Gradient = 0 964285 %

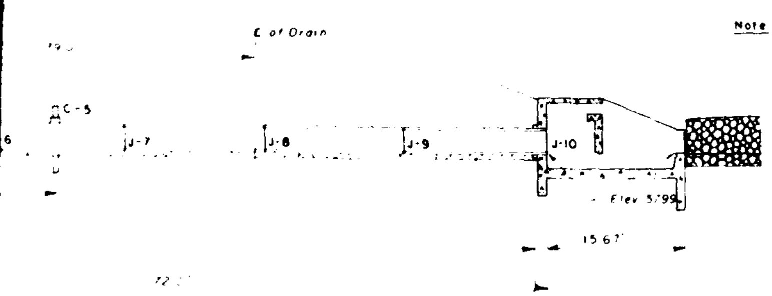
COLLAR LOCATION		
Collar	Distance from Riser Wall	Invert of 30" Conduit
C-1	4 33	581 21
C-2	24 33	581 02
C-3	44 33	580 83
C-4	64 33	580 63
C-5	84 33	580 44

ALTERNATE "B" 16' SECTIONS		
JOINT	DISTANCE FROM RISER	INVERT ELEV OF CONDUIT
J-1	0 33	581 25
J-2	16 33	581 10
J-3	32 33	580 95
J-4	48 33	580 80
J-5	64 33	580 65
J-6	80 .33	580 50
J-7	96 33	580.35
J-8	112 33	580 20
J-9	128 33	580 05
J-10	144 33	579 90

Gradient = 0.9375 %

COLLAR LOCATION		
Collar	Distance from Riser	Invert of 30" Conduit
C-1	4 33	581 21
C-2	24 33	581 03
C-3	44 33	580 84
C-4	68 33	580 61
C-5	88 33	580 43

Note Dimensions for pipe lengths are based on nominal lengths and do not include creep



WAY

SPILLWAY

LIMSTONE STREAM WATERSHED PROJECT
FLOOD-WATER RETARDING DAM NO 2
NOYES BROOK
LIMESTONE, MAINE
PRINCIPAL SPILLWAY DETAILS
U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

Designed M P WHITE	5/68	
E F SNOW	5/68	
	7 / 18	ME-503-P

SCS-313-C (9-64)

TP-1 L. Abutment ℄ Sta. 22+00, 3/ ft. d.s.

0 - 1.5	Topsoil. Silty gravel.	(GM)
1.5 - 10	Sandy gravel. About 5% fines, 40% m. to c. sand, 45% f. to c. gravel, 1% cobbles up to 6". Particles are a mixture of hard and soft, semi-rounded. Moist to ., wet at 5'. Loose. Non-plastic. Very permeable. Outwash. Hole stopped at 10' due to caving of sides. Sample 1-1, 6'-7', Gw.	GW-GM

TP-2 L. Abutment ℄ Sta. 22+00 3 ft. d.s.

0 - 1.5	Topsoil. Silty gravel.	(GM)
1.5 - 11	Gravelly sand. Grey. About 5% fines, 45% f. to c. sand, 40% f. to c. gravel, 10% cobbles, 6" max. Particles mixture of hard, weathered and soft angular. Damp to moist. Loose. Non-plastic. No dilatency (no fines). Very permeable. [illegible] Sample 2-1, 3'-4', Sw. In-place density test taken at 2.5' [illegible] lbs. per cubic foot at 1.1% moisture.	SW-SM
11 - 11.5	Clayey gravel. Grey-brown. About 20% fines, 20% f. to c. sand, 40% f. to c. gravel, 10% cobbles and boulders up to 1.5'. Moist. Very hard. Moderately plastic. No dilatency. Low permeability. Till. Extremely hard digging. Hole caving. Hole stopped at 11.5' in [illegible] Sample 2-2, 11.0'-11.5', GC.	(GC)

TP-3 L. Abutment ℄ Sta. 21+00, 2 ft. u.s.

0 - 1	Topsoil. Silty gravel.	(GM)
1.0 - 11.0	Sandy gravel. Yellow brown. About 5% fines, 40% m. to c. sand, 50% f. to c. gravel, 5% cobbles (6" max.). Mixture of hard and soft particles. Damp. Loose. Non-plastic. Very permeable. [illegible]	(GW)
11 - [illegible]	Clayey gravel. Yellow brown. About 20% fines, 10% sand, 50% f. to c. gravel, cobbles, (6" max.). Moist. Very hard. Moderately plasticity. No dilatency. Low permeability. Till. [illegible]	(GC)

TP-4 L. Abutment ℄ Sta. [illegible]

0 - 1	Topsoil. Silty gravel.	(GM)
1 - 9	Sandy gravel. Yellow brown. About 5% fines, [illegible] sand, 50% f. to c. gravel, cobbles [illegible] maximum. Mixture of [illegible] particles. [illegible] Non-plastic. [illegible] Outwash. Stratified.	(GW)
9 - 13	Clayey gravel. Grey-brown. About 20% fines, [illegible] sand, [illegible] f. to c. gravel [illegible] max.). [illegible] to hard [illegible] semi-rounded. Moist. Very hard. [illegible] plasticity. [illegible] Till. [illegible] Hole stopped in till. No GWT.	(GC)

TP-5 L. Abutment ℄ Sta. 17+00

0 - 1	Topsoil. Silty gravel with roots.	(GM)
1 - [illegible]	Sandy gravel. Yellow brown. About 5% fines, [illegible] sand, 50% f. to c. gravel, 10% cobbles and boulders, [illegible] Damp. Loose. Non-plastic. [illegible]	(GW)
[illegible]	Clean gravelly sand. Grey. 5% fines, [illegible] sand, 25% f. to c. gravel, [illegible] Particles are [illegible] Damp. Loose. Non-plastic. Very permeable. Outwash. [illegible] fine sand size.	(SP)
[illegible] - 10.5	Clayey gravel. Yellow brown. About 20% fines, 10% f. to c. sand, 35% f. to c. gravel, [illegible] cobbles, (1' max.). [illegible] Very hard. Moderate plasticity. No dilatency. Low permeability. Till.	(GC)
10.5 - 11	Clean gravelly sand. Same as 5.5 to 9.5 above.	(SP)
11 - 11+	Clayey gravel. Same as 9.5 to 10.5 above. Hole stopped in till. GWT at 1.5'.	(GC)

TP-6 L. Abutment ℄ Sta. 18+00

0 - 1	Topsoil. Silty gravel.	(GM)
1 - 9.5	Gravelly sand. Yellow brown. About 10% fines, 50% f. to c. sand, 30% f. to c. gravel, (6" max.), 10% cobbles. Moist. Very Hard. Moderate plasticity. No dilatency. Low permeability. Sample 6-1, 1-7.5.	(GW) GP-GM
9.5 - 11.5	Clean medium sand. Grey. About 5% fines, about 80% m. sand, 15% f. to c. gravel, (1" max.). Moist to wet. Loose. Non-plastic. Very permeable. Outwash. GWT at 11.5'.	(SP)

TP-7 L. Abutment 160' u.s. from ℄ Sta. 19+80

0 - 1	Topsoil. Silty gravel.	(GM)
1 - 6	Sandy gravel. Yellow brown. About 5% fines, 35% f. to c. sand, 55% f. to c. gravel, 5% cobbles. (6" max.). Damp. Loose. Non-plastic. Very permeable. Outwash.	(GW)
6 - 13	Gravelly sand. Grey. About 8% fines, 70% f. to c. sand, 20% f. to c. gravel. Moist. Loose. Non-plastic. Very permeable. Outwash. GWT at 13'.	(SW)

TP-8 L. Abutment 120' u.s. from ℄ Sta. 18+90

0 - 1.5	Topsoil	(GM)
1.5 - 5.5	Sandy gravel. Yellow brown. About 10% fines, 30% f. to c. sand, 55% f. to c. gravel, 5% cobbles, (6" maximum). Damp. Loose. Slightly plastic. Moderate dilatency. Very permeable. Outwash.	(GW)
5.5 - 9.0	Clayey gravel. Grey. About 30% fines, 30% f. to c. sand, 30% f. to c. gravel, 10% cobbles, (6" max.). Wet. Hard. Moderate plasticity. No dilatency. Low permeability. Till. GWT at 5.5'.	(GC)
9.0 - 13+	Silty sandy gravel. Yellow brown. About 20% fines, 30% f. to c. sand, 40% f. to c. gravel, 10% cobbles and boulders up to 1.5'. Wet. Hard. Moderate plasticity. Slight dilatency. Moderately permeable. Till.	(GM)

TP-9 L. Abutment 60' d.s. from ℄ Sta. 18+00

0 - 1	Topsoil.	(GM)
1 - 9.0	Gravelly sand. Grey. About 10% fines, 50% m. to c. sand, 35% f. to c. gravel. Damp. Loose. Slightly plastic. Outwash. GWT at 6'.	(GP)
9.0 - 10	Gravelly clay. Yellow brown. About 50% fines, 20% f. to m. sand, 25% f. to c. gravel, 5% cobbles up to 6". Moist. Very hard. Moderately plastic. No dilatency. Low permeability. Till. Sample 9-1, 9'-10', In-place density test taken at 9'. 128 lbs. per cubic foot at 17% moisture.	(CL) SC-SM
10 - 13	Clay. Blue-grey. No coarse particles. Moist. Hard. Moderately plastic. No dilatency. Low permeability. Till. Sample 9-2, 10'-11', blue clay.	(CL) (CL)

TP-10 L. Abutment 130' d.s. from ℄ Sta. 19+50

0 - 1	Topsoil	(GM)
1 - 13	Sandy gravel. Yellow brown. About 5% fines, 20% m. to c. sand, 50% f. to c. gravel, 25% cobbles, (8" max.). Dry. Loose. Non-plastic. Very permeable. Outwash. Very limited 1' layer of GC at 7'. The GW becomes a gravelly sand at 8.5. No GWT.	(GW)

TP-11 L. Abutment 120' d.s. from ℄ Sta. 21+70

0 - 1	Topsoil	(GM)
1 - 12.5	Sandy gravel. Grey-brown. About 5% fines, 30% m. to c. sand, 40% f. to c. gravel, 25% cobbles and boulders, (15.' max.). Damp. Loose. Non-plastic. Very permeable. GWT at 12.5. 1' layer of GC at 6'. Several (?) 2' boulders.	(GP)

TP-12 L. Abutment 120' d.s. from ℄ Sta. 21+50

0 - 1.5	Topsoil	(GM)
1.5 - 5.0	Sandy gravel. Yellow brown. About 5% fines, 25% m. to c. sand, 40% f. to c. gravel, 30% cobbles and boulders, (.' max.). Damp. Loose. Non-plastic. Very permeable. Outwash.	(GP)
5 - 11.0+	Clayey bouldery gravel. Olive grey. About 20% fines, 20% f. to c. sand, 25% f. to c. gravel, 35% cobbles and boulders, (.' max.). Moist. Hard. Moderately plastic. No dilatency. Low permeability. Till. GWT at 6'.	(GC)

TP-13 L. Abutment 100' u.s. from ℄ Sta. 21+50

0 - 1.0	Topsoil	(GM)
1.0 - 9.5	Sandy coarse gravel. Grey brown. About 10% fines, 30% m. to c. sand, 50% f. to c. gravel, 10% cobbles, (6" max.). Damp. GWT at 7'. Loose. Non-plastic. Rapid dilatency. Very permeable. Outwash.	(GW)
9.5 - 10+	Clayey gravel. Yellow brown. About 30% fines, 30% f. to c. sand, 30% f. to c. gravel, 10% cobbles, (6" max.). Moist. Hard. Moderately plastic. No dilatency. Low permeability. Till. (Striated cobbles.).	(GC)

TP-14 ℄ Sta. 25+00 in Stream Valley

0 - 2	Peat and Muck. With cobbles. GWT at surface. Logs and roots.	(Pt)
2 - 11	Silty gravelly sand. With cobbles. Grey. About 15% fines, 40% f. to c. sand, 25% f. to c. gravel, 20% f. to c. cobbles, occasional boulders (1' max.). Thin (1"-2") layers of silt (ML). Wet. Loose. Moderately plastic. Rapid dilatency. Very permeable. Outwash. The percent of sand and gravel vary 15-20%.	(SW)
11 - 12	Clayey gravelly sand. Grey. About 30% fines, 40% f. to c. sand, 25% f. to c. gravel, 5% cobbles, (6" max.). Wet. Very hard. Moderately plastic. No dilatency. Slow permeability. Till.	(GC-SC)

TP-15 ℄ Sta. 24+50 in Stream Valley

0 - 4	Peat and Muck, much organic matter. GWT at surface.	
4 - 10+	Interlayered silty gravelly sand and poorly graded gravelly sand. Grey. About 5% fines, 50% f. to m. sand, 30% f. to c. gravel, 10% cobbles, 5% boulders, (1' max.). Wet. Loose. Thin (1") silty layers are moderately plastic. Very permeable. Outwash. Sample 15-1, 4'-6', SM and SP.	

TP-16 ℄ Sta. 24+15 in Stream

0 - 2	Peat and Muck. GWT at surface.	
2 - 5	Gravelly sand or sandy gravel. Grey-brown. About 5% fines, 40% f. to m. sand, 40% f. to c. gravel, 15% cobbles, (6" max.). Wet. Loose. Slightly plastic. Rapid dilatency. Very permeable.	
5 - 11+	Gravelly sandy silt. Olive-grey. About 50% fines, 20% fine sand, 30% m. gravel. Moist. Very hard. Moderately plastic. Rapid dilatency. Slow permeability. Outwash? Sample 16-1, 6'-8', ML.	

TP-17 ℄ Sta. 23+60 (Left bank of Stream)

0 - 2	Peat and Muck. GWT at surface.	
2 - 5	Sandy gravel. Grey. About 5% fines, 45% f. to m. sand, 45% f. to c. gravel, 5% cobbles. Wet. Loose. Slightly plastic. Rapid dilatency. Very permeable. Outwash.	
5 - 12+	Silty clay. Grey. About 90% fines, 10% sand and gravel. Moist. Very hard and stiff. Moderately plastic. Very slow dilatency. Very low permeability. Sample 17-1, 6'-8', ML.	

TP-18 ℄ Sta. 23+00

0 - 1	Peat and Muck. GWT at surface.	
1 - 5	Sandy gravel. Grey. About 10% fines, 40% f. to c. sand, 40% f. to c. gravel, 10% cobbles, (6" max.). Wet. Hard. Slightly plastic. Rapid dilatency. Very permeable. Outwash. Sample 18-1, 4', GW.	
5 - 9	Gravelly sand. Yellow-brown. About 5-10% fines, 40% f. to m. gravel, 50% f. to m. sand. Wet. Loose. Non-plastic. Rapid dilatancy. Very permeable. Outwash.	
9 - 11	Clayey gravelly sand. Yellow-brown. About 30% fines, 30% f. to c. sand, 30% f. to c. gravel, 10% cobbles, (6" max.). Moist. Hard. Moderately plastic. No dilatency. Low permeability. Till. Sample 18-2, 9'-10', SC-GC.	

TP-19 R. Abutment 75' u.s. from ℄ Sta. 25+75

0 - 1.5	Field stones.	
1.5 - 2	Topsoil.	
2 - 11+	Clayey gravelly sand. Yellow brown. About 25% fines, 40% f. to c. sand, 30% f. to c. gravel, 5% cobbles and boulders, (1.5' max.). Wet below 4'. Very hard. Moderately plastic. No dilatency. Low permeability. Till. GWT at 4'. Sample 19-1, 5', SC.	

TP-20 R. Abutment 230' u.s. from ℄ Sta. 26+90

0 - 1	Topsoil	
1 - 1.+	Gravelly silty sand. Yellow brown. About 10% fines, 50% f. to c. sand, 30% f. to c. gravel, 10% cobbles, (6" max.). Moist. Hard. Slightly plastic. Rapid dilatency. Very permeable. Outwash. GWT at 5'.	

TP-21 R. Abutment 290' u.s. from ℄ Sta. 26+60

0 - 1	Topsoil	
1 - 7	Gravelly sand. Yellow brown. About 5% fines, 50% m. sand, 40% f. to c. gravel, 5% cobbles. (6" max.). Moist. Loose. Non-plastic. Rapid dilatency. Very permeable. Outwash.	
7 - 13	Bouldery sandy gravel. About 5% fines, 20% m. sand, 30% f. to c. gravel, 45% cobbles and boulders up to 2'. Moist. Loose. Non-plastic. Rapid dilatency. Very permeable. Outwash. GWT at 7'.	
at 13	Bedrock. Greyish limey shale.	

TP-22 R. Abutment 220' d.s. from ℄ Sta. 26+10

0 - 2	Topsoil and slope wash.	
2 - 9	Silty sandy gravel. Yellow brown. About 15% fines, 25% f. to c. sand, 50% f. to c. gravel, 10% cobbles. Moist. Hard. Moderately plastic. Moderate dilatency. Moderately permeable. Outwash. GWT at 8'.	
9 - 12.5+	Clayey gravel. Grey-brown. About 25% fines, 30% f. to c. sand, 40% f. to c. gravel, 5% cobbles, occasional boulders to 2'. Wet. Hard. Moderately plastic. Slow dilatency. Slow permeability. Till.	

2

ream Valley

, much organic matter. (Pt)
.
ilty gravelly sand and (SM+SP)
gravelly sand. Grey.
, 50% f. to m. sand, 30% [SM]
el, 10% cobbles, 5% boul-
.). Wet. Loose. Thin
vers are moderately plas-
rmeable. Outwash. Sample
M and SP.

ream

, GWT at surface. (Pt)
d or sandy gravel. Grey- (GP)
5% fines, 40% f. to m.
to c. gravel, 15% cobbles,
et. Loose. Slightly plas-
ilatency. Very permeable.
ly silt. Olive-grey. (ML)
nes, 2% fine sand, 20% m.
st. Very hard. Moderately [ML]
id dilatency. Slow perm-
utwash? Sample 16-1, 6'-8',

t bank of Stream)

k. GWT at surface. (Pt)
Grey. About 5% fines, (GW)
sand, 45% f. to c. gravel,
Wet. Loose. Slightly
pid dilatency. Very perm-
ash.
Grey. About 90% fines, (CL or ML)
gravel. Moist. Very hard
Moderately plastic. Very
ncy. Very low permeability. [CL-ML]
, 6'-8', ML.

ck. GWT at surface. (Pt)
l. Grey. About 10% fines, (GW)
. sand, 40% f. to c. gravel, [SC-SM]
, (6" max.). Wet. Hard. or
astic. Rapid dilatency. Very [GC-GM]
Outwash. Sample 18-1, 4',

nd. Yellow-brown. About 5- (SW)
40% f. to m. gravel, 50% f. to
Wet. Loose. Non-plastic.
ency. Very permeable. Out-

velly sand. Yellow-brown. (GC-SC)
fines, 30% f. to c. sand, 30%
ravel, 10% cobbles, (6" max.). [SM]
Moderately plastic. No
Low permeability. Till.
, 9'-10', GC-SC.

d.s. from ℄ Sta. 25+70

(ML)
velly sand. Yellow brown. (SC)
fines, 40% f. to c. sand, 30% [SM]
ravel, 5% cobbles and boulders,
0. Wet below 4'. Very hard.
plastic. No dilatency. Low
ty. Till. GWT at 4'. Sample
C.

d.s. from ℄ Sta. 26+90

(ML)
ilty sand. Yellow brown. (SW-SM)
fines, 50% f. to c. sand, 30%
gravel, 10% cobbles, (5" max.).
amp. Slightly plastic. Rapid
Very permeable. Outwash.

0' d.s. from ℄ Sta. 26+60

(ML)
sand. Yellow brown. About 5% (SP)
% m. sand, 40% f. to c. gravel,
. (6" max.). Moist. Loose.
ic. Rapid dilatency. Very
. Outwash.
sandy gravel. About 5% fines, (GW)
nd, 30% f. to c. gravel, 65%
nd boulders up to 2'. Moist.
on-plastic. Rapid dilatency.
eable. Outwash. GWT at 7'.
Greyish limey shale. (SH)

0' d.s. from ℄ Sta. 26+10

nd slope wash. (ML)
dy gravel. Yellow brown. (GM)
fines, 25% f. to c. sand,
c. gravel, 10% cobbles
ard. Moderately plastic.
dilatency. Moderately perm-
utwash. GWT at 8'.
avel. Grey-brown. About 25% (GC)
% f. to c. sand, 40% f. to c.
% cobbles, occasional boulders
et. Hard. Moderately plastic.
tency. Slow permeability.

TP-23 R. Abutment ℄ Sta. 25+50 Edge of Road

0 - 1	Topsoil.	(GM)
1 - 13+	Sandy gravel or gravelly sand. Greyish-brown. About 10% fines, 40% m. sand, 40% f. to c. gravel, 10% cobbles, (6" max.). Damp. Loose. Non-plastic. Rapid dilatency. Very permeable. Outwash. GWT at 10'. Sample 23-1, 5'-8', SP.	(SP) [SM]

TP-24 R. Abutment 10' d.s. from ℄ Sta. 26+90

0 - 1	Topsoil.	(GM)
1 - 7	Clayey sandy gravel. Yellow brown. About 35% fines, 25% f. to sand, 35% f. to c. gravel, 5% cobbles, (1' max.). Damp. Hard. Moderately plastic. No dilatency. Slow permeability. Till.	(GC)
At 7	Bedrock. Brittle shale. Breaks into sharp angular pieces up to 6".	(SH)

TP-25 R. Abutment 125' d.s. from ℄ Sta. 26+60

0 - 1	Topsoil.	(ML)
1 - 3	Sandy gravel. Yellow brown. About 15% fines, 40% f. to m. sand, 45% f. to c. gravel. Damp. Loose. Slightly plastic. Moderate dilatency. Moderately permeable. Outwash.	(GM)
3	Clayey sand gravel. Yellow brown. About 35% fines, 20% f. to c. sand, 40% f. to c. gravel, 5% cobbles, occasional 1' boulders. Damp. Hard. Moderately plastic. No dilatency. Low permeability. Till.	(GC)
At 8	Bedrock. Brittle shale.	(SH)

TP-101 Em. Spwy. - Back side of pond on hill level

0 - 1	Topsoil.	(ML)
1 - 10.5+	Gravelly sand. About 5-10% fines, 50% f. to m. sand, 35% f. to c. gravel, 5% cobbles. Damp. Loose. Rapid dilatency. Non-plastic. Very permeable.	(SP)

TP-102 In back field along Durepo Road

0 - 2	Dry peat.	(Pt)
2 - 4	Silty sandy gravel. GWT at 4'.	(GM)
4 - 8	Sandy gravel. Loose. 10% fines, 30% f. to c. sand, 60% f. to c. gravel.	(GP)
8 - 10+	Clayey gravel. 40% fines, 60% gravel.	(GC)

LIMESTONE STREAM WATERSHED PROJECT
FLOOD-WATER RETARDING DAM NO 2
NOYES BROOK
LIMESTONE, MAINE
TEST PITS

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

INVESTIGATED D. ERINAKES
BY L. GERRY 2/68
D. Zurakis

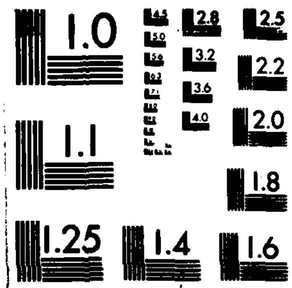
ME-503-P

SCS 313 (9-64)

AD A155 388 NATIONAL PROGRAM FOR INSPECTION OF NON-FEDERAL DAMS NOYES BROOK DAM (ME 0..(U) CORPS OF ENGINEERS WALTHAM MA NEW ENGLAND DIV SEP 81 2/2

UNCLASSIFIED F/G 13/13 NL

END
DATE FILMED
8-85
DTIC



MICROCOPY RESOLUTION TEST CHART
NATIONAL BUREAU OF STANDARDS-1963-A

TP-201 En. Surv. ℄ Sta. 3+00

0 - 1	Fieldstones up to 1.5'.	
1 - 4	Silty gravel. Yellow brown. About 15% fines, 30% f. to c. sand, 45% f. to c. gravel, 10% cobbles. Damp. Moderately hard. Slightly plastic. Till.	(GM)
4 - 10+	Clayey gravel. Yellow brown. About 25% fines, 35% f. to c. sand, 35% f. to c. gravel, 5% cobbles, occasional boulders to 1.5 max. Wet. Hard. Moderately plastic. Very slow dilatancy. Slow permeability. Till. GWT at 7'.	(GC)

TP-202 En. Surv. ℄ Sta. 4+10

0 - 1	Topsoil.	(GM)
1 - 3	Silty gravel. Yellow brown. About 15% fines, 40% f. to c. sand, 40% f. to c. gravel, 5% cobbles to 6". Dry. Moderately hard. Slightly plastic. Moderately permeable. Till. Sample 202-1, 2'-3', GM.	(GM-SM) [GM]
3 - 7	Clayey bouldery gravel. Grey brown. About 25% fines, 20% f. to c. sand, 25% f. to c. gravel, 30% cobbles, occasional boulders up to 1.5'. Damp. Extremely hard. Moderately plastic. No dilatancy. Slow permeability. Till (striated cobbles). Sample 202-2, 4'-5', GC.	(GC) [SC-SM]
7 - 9.5	Sandy gravel. Grey. About 10% fines, 30% m. sand, 50% f. to c. gravel, 10% cobbles, (6" max.). Damp. Moderately Hard. Slightly plastic. Moderately permeable. Outwash. Dry hole. Sample 202-3, 8'-9', GP.	(GP) [GM]

TP-203 En. Surv. ℄ Sta. 5+90

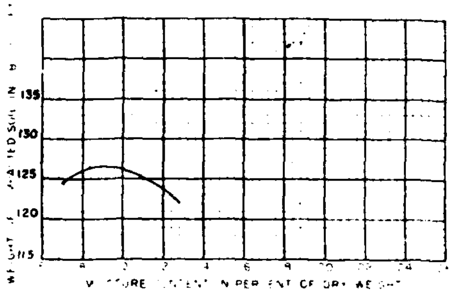
0 - 1	Topsoil.	(GM)
1 - 3	Silty sandy gravel. Yellow brown. About 10% fines, 40% f. to c. sand, 40% f. to c. gravel, 10% cobbles, occasional boulders to 1'. Damp. Loose. Slightly plastic. Moderately permeable. Outwash. Sample 203-1, 2'-3', GM.	(GM) [GM]
3 - 6	Clean gravelly sand. Grey. No fines, About 60% m. to c. sand, 35% f. to c. gravel, 5% cobbles. Damp. Loose. Non-plastic. Very permeable. Outwash. Sample 203-2, 3'-4', SP.	(SP) [GM]
6 - 10	Clayey gravel. Grey brown. About 30% fines, 30% f. to c. sand, 30% f. to c. gravel, 10% cobbles and boulders, 1 boulder up to 2.5'. Damp. Very hard. Moderately plastic. Slow permeability. Till. Sample 203-3, 8'-10', GC. In-place density test taken at 8'. 132 lbs. per cubic foot at 10.7% moisture.	(GC) [GC-GM]
10 - 12+	Clean gravelly sand. About 60% m. to c. sand, 40% f. to c. gravel. Outwash. No GWT.	(SP)

TP-204 En. Surv. ℄ Sta. 8+20

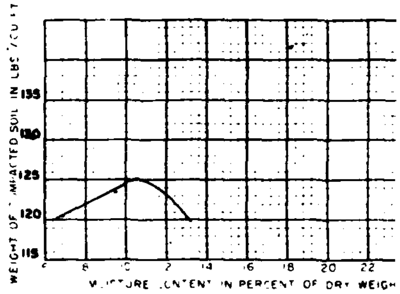
0 - 1	Topsoil.	(GM)
1 - 8	Silty sandy gravel. Yellow brown. About 15% fines, 35% f. to c. sand, 40% f. to c. gravel, 10% cobbles, occasional boulders up to 1'. Damp. Moderately hard. Moderately plastic. Moderately permeable. Till. Sample 204-1, 4', GM. In place density test taken at 4'. 126 lbs per cubic foot at 12% moisture.	(GM) [GM]
8 - 13	Clayey gravel. Yellow brown. About 25% fines, 30% f. to c. sand, 35% f. to c. gravel, 10% cobbles and boulders up to 2' max. Moist. Hard. Moderately plastic. Low permeability. Till. GWT at 7'.	(GC)

TP-205 Test hole in gravel pit, 135' N. En. Surv. ℄ Sta. 8+5½

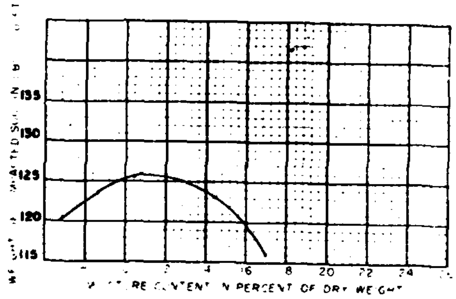
0 - 5	Silty gravel. Yellow brown. About 10% fines, 40% f. to c. sand, 40% f. to c. gravel, 10% cobbles, occasional boulders to 1.5'. Dry. Loose. Slightly plastic. Moderately permeable. Outwash.	(GM)
5 - 20	Silty gravel.. Brown-grey. About 20% fines, 10% cobbles, 35% f. to c. sand; 35% f. to c. gravel, occasional boulders to 1.5'. Damp; Moderately hard. Moderately plastic. Moderate permeable. Till.	(GM)



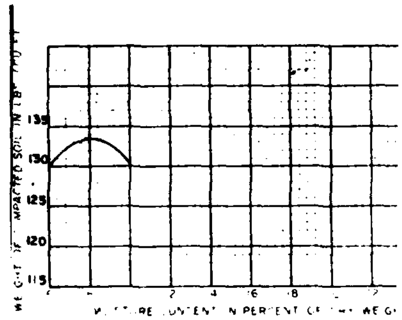
COMPACTION CURVE
FIELD SAMPLE NO. 202.1
LABORATORY CLASSIFICATION -, GM



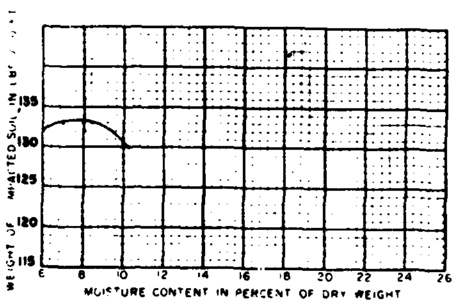
COMPACTION CURVE
FIELD SAMPLE NO. 203.2
LABORATORY CLASSIFICATION -,



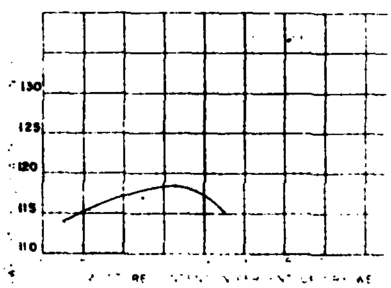
COMPACTION CURVE
FIELD SAMPLE NO. 202.2
LABORATORY CLASSIFICATION -, SC-SM



COMPACTION CURVE
FIELD SAMPLE NO. 203.3
LABORATORY CLASSIFICATION -,



COMPACTION CURVE
FIELD SAMPLE NO. 202.3
LABORATORY CLASSIFICATION -, GM



COMPACTION CURVE
FIELD SAMPLE NO. 204.1
LABORATORY CLASSIFICATION -

2

LEGEND

TP-4	Test Pit (backhoe)
GWT	Ground Water Table
u.s. or d.s.	Upstream or downstream
Em. Spwy.	Emergency Spillway
L. Abut. or R. Abut.	Left Abutment or Right Abutment
(GC)	Field classification
[GP]	Lab classification

TEST PIT NUMBERING SYSTEM

1-99	Centerline of Dam
101-199	Borrow Area
201-299	Emergency Spillway

BEDROCK SYMBOLS

Sh	Shale

UNIFIED SOIL CLASSIFICATION SYSTEM SYMBOLS

GW	Well graded gravels; gravel sand mixture
GP	Poorly graded gravels
GM	Silty gravels; gravel-sand-silt mixtures
GC	Clayey gravels; gravel-sand-clay mixtures
SW	Well graded sand; sand-gravel mixtures
SP	Poorly graded sands
SM	Silty sands; sand-silt mixtures
SC	Clayey sand; sand-clay mixtures
ML	Silts; silty, v. fine sands; sandy or clayey silts
CL	Clays of low to medium plasticity; silty, sandy, or gravelly clays
Pt	Peat

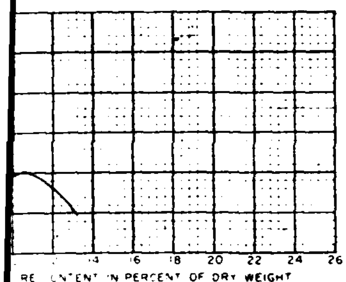
NOTE: All descriptions and classifications based on visual observations and the Unified Soil Classification System.

All test pits are located on plans and profiles for the site.

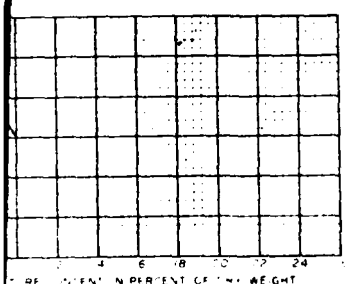
Test pitting accomplished from 6/21/67 to 6/27/67. All test pits logged by O. Erinakes, Geologist.

All test pits were dug with a truck-mounted hydraulic backhoe, Hy-Hoe 300.

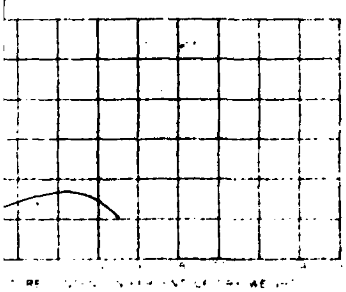
All test hole depths at in feet.



COMPACTION CURVE
FIELD SAMPLE NO. 203.2
LABORATORY CLASSIFICATION -, GM



COMPACTION CURVE
FIELD SAMPLE NO. 203.3
LABORATORY CLASSIFICATION -, GC-GM



COMPACTION CURVE
FIELD SAMPLE NO. 204.1
LABORATORY CLASSIFICATION -, GM

LIMESTONE STREAM WATERSHED PROJECT
FLOOD-WATER RETARDING DAM NO. 2
NOYES BROOK
LIMESTONE, MAINE
TEST PITS

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

INVESTIGATED BY	Date	Approved by
[illegible] O. ERINAKES	6-67	Title
[illegible] L. BERRY	2/68	Title
Traced		Sheet [illegible] of [illegible]
Checked N		Drawing No. ME-503-P

PART I – INVENTORY OF DAMS IN THE UNITED STATES
(PURSUANT TO PUBLIC LAW 92-367)

See reverse side for instructions.

FORM APPROVED
OMB NO. 49-R0421

REQUIREMENTS CONTROL SYMBOL
DAEN–CWE–17

STATE	IDENTITY NUMBER
ME	00347

IDENTIFICATION

[2] DIVISION	[3] STATE	[4] COUNTY	[5] CONGR DIST	[6] STATE	[7] COUNTY	[8] CONGR DIST	[9] NAME	[10] LATITUDE (North)	[11] LONGITUDE (West)	[12] REPORT DATE (DAY MO YR)	
NE	ME	003	02				NOYES BROOK DAM	4655.8	6750.8	17FEB81	0

IDENTIFICATION (Continued)

[13] POPULAR NAME	[14] NAME OF IMPOUNDMENT	
SAME	UNNAMED	1

LOCATION

[15] REGION	[16] BASIN	[17] RIVER OR STREAM	[18] NEAREST DOWNSTREAM CITY – TOWN – VILLAGE	[19] DIST. FROM DAM (mi)	[20] POPULATION	
01	01	NOYES BROOK	LIMESTONE	1.5	0430	2

STATISTICS

[21] TYPE OF DAM	[22] YEAR COMPLETED	[23] PURPOSES	[24] STRUCTURAL HEIGHT (ft)	[25] HYDRAULIC HEIGHT (ft)	[26] IMPOUNDING CAPACITIES MAXIMUM (acre – ft.)	[27] NORMAL (acre – ft.)	[27A] CORPS ENGR. DIST.	[27B] OWN.	[27C] FED. R.	[27D] PRV/FED	[27E] SCS A.	[27F] VERIFICATION DATE (DA MO YR)	BLANK	
RE	1970	C,R	31	29	350	34		N	N	N	T			3

REMARKS

[28] REMARKS	
	4

ENG FORM 1 DEC 77 4474

PART II - INVENTORY OF DAMS IN THE UNITED STATES

(PURSUANT TO PUBLIC LAW 92-367)

See reverse side for instructions.

FORM APPROVED
OMB NO. 49-R0421

REQUIREMENTS CONTROL SYMBOL
DAEN-CWE-17

STATE	IDENTITY NUMBER
ME	00947

STATISTICS

[29] D/S HAZ	[30] CREST LENGTH (ft)	[31] SPILLWAY TYPE	[32] SPILLWAY WIDTH (ft)	[33] SPILLWAY MAXIMUM DISCHARGE (cfs)	[34] VOLUME OF DAM (CY)	[35] POWER CAPACITY INSTALLED (MW)	[36] POWER CAPACITY PROPOSED (MW)	[37] NAVIGATION LOCKS	[38] LENGTH (ft)	[39] WIDTH (ft)	[40] LENGTH (ft)	[41] WIDTH (ft)	[42] LENGTH (ft)	[43] WIDTH (ft)	[44] LENGTH (ft)	[45] WIDTH (ft)	BLANK
2	1000	U	15	148													

MISC DATA

[46] OWNER	[47] ENGINEERING BY	[48] CONSTRUCTION BY
TOWN OF LIMESTONE	SOIL CONSERVATION SERVIC	HORNBROOK, INC.

MISC. DATA (Continued)

[49] REGULATORY AGENCY: DESIGN	[50] CONSTRUCTION	[51] OPERATION	[52] MAINTENANCE
NONE	NONE	NONE	NONE

MISC. DATA (Continued)

[53] INSPECTION BY	[54] INSPECTION DATE DAY / MO / YR	[55] AUTHORITY FOR INSPECTION

REMARKS

[56] REMARKS

ENG FORM 1 DEC 77 4474A

PART III - INVENTORY OF DAMS IN THE UNITED STATES
SUPPLEMENTARY DATA

STATE	IDENTITY NUMBER
ME	00347

LOCATION

	A-1 TOWN	A-2 NED PERMIT NO	A-3 STATE NUMBER	A-4 FERC NO	A-5 USGS SHEET	
A	NONE				LIMESTONE, MAINE	

DRAINAGE CHARACTERISTICS

	B-1 DRAINAGE AREA SQ MI	B-2 FLOW DATA MIN CFS	B-3 FLOW DATA AVE. CFS	B-4 FLOW DATA MAX CFS	B-5 CREST ELEV MSL	B-6 ABUT. ELEV. MSL	B-7 USABLE STORAGE ACRE FEET	B-8 RESERVOIR AREA ACRES	B-9 FLASH BOARD HT FEET	B-10 OUTLET CONDUITS NO	B-11 OUTLET CONDUITS SIZE	B-12 INVERT ELEV MSL
B	3				611.2		94	4		1	30 1 WCA	532.5

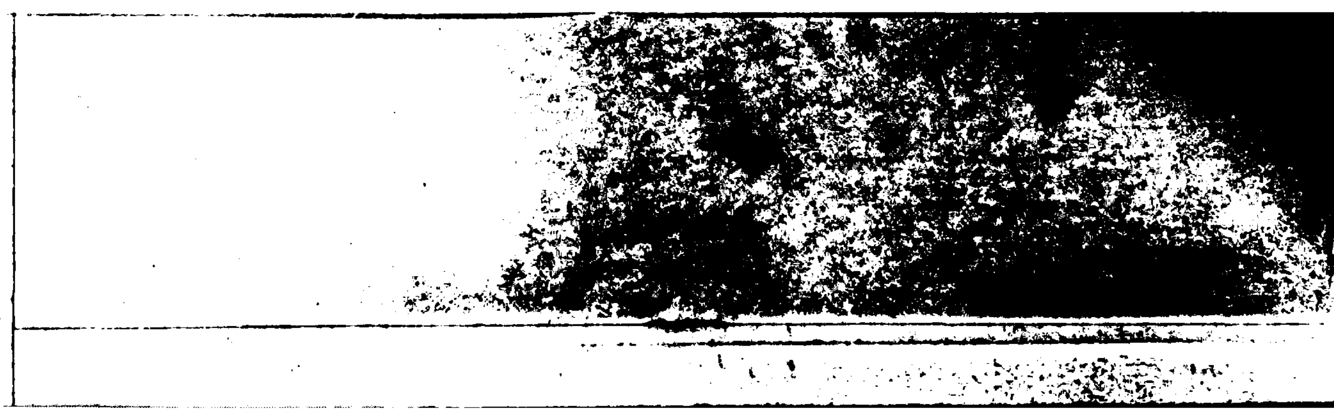
POWER DATA

	C-1 GENERATION UNITS INSTALLED NO CAP KW	C-2 GENERATION UNITS PLANNED NO CAP KW	C-3 AVERAGE ANNUAL GENERATION KWH	C-4 LAST GEN YEAR	C-5 RETIRED YEAR	C-6 FORMER USE	C-7 CAPACITY FACTOR
C							

D	

E	

NED FORM 1 JAN 79 80(TEST)



PART III - INVENTORY OF DAMS IN THE UNITED STATES
SUPPLEMENTARY DATA

	A-1	A-2	A-3	A-4	
LOCATION	TOWN	NED PERMIT NO.	STATE NUMBER	F.E.R.C. NO	
	NONE				LIMESTO

	B-1	B-2	B-3	B-4	B-5	B-6	B-7	B-8	B-9
DRAINAGE CHARACTER-ISTICS	DRAINAGE AREA SQ MI	FLOW DATA MIN. C.F.S.	FLOW DATA AVE. C.F.S.	FLOW DATA MAX. C.F.S.	CREST ELEV. M.S.L.	ABUT. ELEV. M.S.L.	USABLE STORAGE ACRE FEET	RESERVOIR AREA ACRES	FLASH BOARD HT FEET
	3				611.2		94	4	

	C-1						C-2	C-3	C-4	C-5	C-6	C-7
POWER DATA	GENERATION UNITS INSTALLED NO.	CAP	K.W.	PLANNED NO	CAP.	K.W.	AVERAGE ANNUAL GENERATION K.W.H.	LAST GEN YEAR	RETIRED YEAR	FORMER USE	CAPACITY FACTOR	

NED FORM 1 JAN 79 80(TEST)

2

III - INVENTORY OF DAMS IN THE UNITED STATES
SUPPLEMENTARY DATA

STATE	IDENTITY NUMBER
ME	00347

(A-2) (A-3) (A-4) (A-5)

NED PERMIT NO.	STATE NUMBER	F.E.R.C. NO	U.S.G.S. SHEET	
			LIMESTONE, MAINE	A

(B-4) (B-5) (B-6) (B-7) (B-8) (B-9) (B-10) (B-11) (B-12)

MAX. C.F.S.	CREST ELEV. M.S.L.	ABUT. ELEV. M.S.L.	USABLE STORAGE ACRE FEET	RESERVOIR AREA ACRES	FLASH BOARD HT FEET	OUTLET CONDUITS NO.	OUTLET CONDUITS SIZE	INVERT ELEV. M.S.L.	
	611.2		94	4		1	30 INCH	5825	B

(C-3) (C-4) (C-5) (C-6) (C-7)

AVERAGE ANNUAL GENERATION K.W.H.	LAST GEN YEAR	RETIRED YEAR	FORMER USE	CAPACITY FACTOR	
					C

	D

	E

PART I – INVENTORY OF DAMS IN THE UNITED STATES
(PURSUANT TO PUBLIC LAW 92-367)

See reverse side for instructions.

IDENTIFICATION

[2] DIVISION	[3] STATE	[4] COUNTY	[5] CONGR DIST	[6] STATE	[7] COUNTY	[8] CONGR DIST	[9] NAME
NE	ME	003	02				NOYES BROOK DAM

IDENTIFICATION (Continued)

[13] POPULAR NAME	
SAME	UNNAMED

LOCATION

[15] REGION	[16] BASIN	[17] RIVER OR STREAM	[18] NEAREST DOWNSTR[EAM] CITY – TOWN – VI[LLAGE]
01	01	NOYES BROOK	LIMESTONE

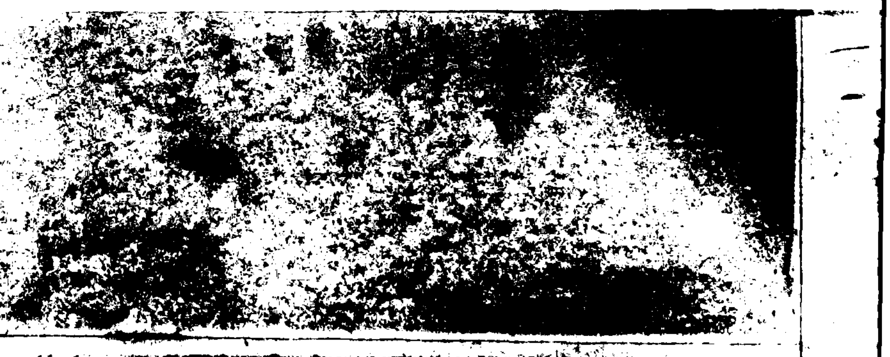
STATISTICS

[21] TYPE OF DAM	[22] YEAR COMPLETED	[23] PURPOSES	[24] STRUCTURAL HEIGHT (ft)	[25] HYDRAULIC HEIGHT (ft)	[26] IMPOUNDING CAPACITIES MAXIMUM (acre – ft.)	[27] NORMAL (acre – ft.)
RE	1970	C,R	31	29	350	3[illegible]

REMARKS

[28] REMARKS

ENG FORM 1 DEC 77 4474



2

S IN THE UNITED STATES
.IC LAW 92-367)

instructions.

FORM APPROVED
OMB NO. 49-R0421

REQUIREMENTS CONTROL SYMBOL
DAEN-CWE-17

STATE		IDENTITY NUMBER				
1	2	3	4	5	6	7
M	E	0	0	3	4	7

[9] NAME	[10] LATITUDE (North)	[11] LONGITUDE (West)	[12] REPORT DATE (DAY MO YR)	80
ROOK DAM	4655.8	6750.8	17 FEB 81	0

	[14] NAME OF IMPOUNDMENT	80
	UNNAMED	1

	[18] NEAREST DOWNSTREAM CITY - TOWN - VILLAGE	[19] DIST. FROM DAM (mi)	[20] POPULATION	80
	LIMESTONE	1.5	0430	2

[24] STRUCTURAL HEIGHT (ft)	[25] HYDRAULIC HEIGHT (ft)	[26] IMPOUNDING CAPACITIES MAXIMUM (acre - ft.)	[27] NORMAL (acre - ft.)	[27A] CORPS ENGR. DIST.	[27B] OWN.	[27C] FED. R.	[27D] PRV/FED	[27E] SCS A.	[27F] VERIFICATION DATE DA MO YR	BLANK	80
31	29	350	34		N	N	N	T			3

[28] REMARKS	80
	4

PART II – INVENTORY OF DAMS IN THE UNITED STATES

(PURSUANT TO PUBLIC LAW 92–367)

See reverse side for instructions.

	[29]	[30]	[31]	[32]	[33]	[34]	[35]	[36]	[37]	[38]	[39]	[40]
				SPILLWAY			POWER CAPACITY					NAV
STATISTICS	D/S HAZ	CREST LENGTH (ft)	TYPE	WIDTH (ft)	MAXIMUM DISCHARGE (cfs)	VOLUME OF DAM (CY)	INSTALLED (MW)	PROPOSED (MW)	NO.	LENGTH (ft)	WIDTH (ft)	LENGTH (ft)
	2	1000	U	15	148							

	[46]	[47]
MISC. DATA	OWNER	ENGINEERING BY
	TOWN OF LIMESTONE	SOIL CONSERVATION SERVIC HO

	[49]	[50]	[51]
	REGULATORY AGENCY		
MISC. DATA (Continued)	DESIGN	CONSTRUCTION	OPERATION
	NONE	NONE	NONE

	[53]	[54]	
MISC. DATA (Continued)	INSPECTION BY	INSPECTION DATE (DAY / MO / YR)	AU

	[56]
REMARKS	REMARKS

ENG FORM 1 DEC 77 4474A

2

…AMS IN THE UNITED STATES
…BLIC LAW 92–367)

…for instructions.

FORM APPROVED OMB NO. 49–R0421	STATE		IDENTITY NUMBER				
REQUIREMENTS CONTROL SYMBOL DAEN–CWE–17	1	2	3	4	5	6	7
	M	E	0	0	3	4	7

[35] [36] [37] [38] [39] [40] [41] [42] [43] [44] [45]

…F DAM	POWER CAPACITY: INSTALLED (MW)	POWER CAPACITY: PROPOSED (MW)	NAVIGATION LOCKS: NO.	LENGTH (ft)	WIDTH (ft)	LENGTH (ft)	WIDTH (ft)	LENGTH (ft)	WIDTH (ft)	LENGTH (ft)	WIDTH (ft)	BLANK	
31–34	35–40	41–46	47	48–51	52–54	55–58	59–61	62–65	66–68	69–72	73–75	76–79	80
	//////	//////	/	////	///	////	///	////	///	////	///	//	5

[47] [48]

	ENGINEERING BY	CONSTRUCTION BY	
30–31	32–55	56–79	80
/	SOIL CONSERVATION SERVIC	HORNBROOK, INC.	6

[50] [51] [52]

REGULATORY AGENCY: CONSTRUCTION	OPERATION	MAINTENANCE	
30–43	44–61	62–79	80
//////////////	NONE	NONE	7

[54] [55]

	INSPECTION DATE (DAY / MO / YR)	AUTHORITY FOR INSPECTION	
30–40	41–47	48–79	80
			8

[56]

REMARKS	
30–79	80
	9

END

DATE
FILMED

8 - 85

DTIC